SUGGESTIONS

FOR

INSTRUCTION IN COLOR

Color Instruction

SUGGESTIONS FOR A COURSE

OF

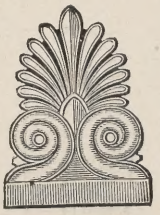
INSTRUCTION IN COLOR

FOR

PUBLIC SCHOOLS

BY

LOUIS PRANG, MARY DANA HICKS, JOHN S. CLARK



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AUTHORS' PREFACE.

We offer this little book in the hope that it may prove in some degree an aid to those who are endeavoring to develop the perception, appreciation, and enjoyment of color in public schools.

In these pages there are presented two fundamental ideas which are essentially new.

1. *The ideal color unit.*

For purposes of education there must be a unit of color, and the color unit must be the embodiment of all pure color. In all color courses hitherto presented, the solar spectrum has been considered as the embodiment of all color. The solar spectrum, however, is known to be incomplete, as it lacks a series of hues which are found in nature and which are necessary to a complete color unit. Nature nowhere gives a complete color unit. It is necessary, therefore, to form an ideal color unit, and this ideal color unit is here presented for the first time as the basis of color instruction.

2. *Investigation of the color perception of the child as the starting-point of color instruction.*

Hitherto color instruction has been based upon theory only, and colors have been arbitrarily given without any consider-

ation of the power of color perception in the child. In this course an appeal to the color perception of the child is for the first time presented in a course of exercises, leading to a knowledge of color through the development of the color sense.

A course of study for the introduction of color as a feature in public-school instruction is given in the following pages. It is hoped that the true spirit of the work will be perceived by teachers, — that the course is not intended to be arbitrary and prescriptive, imposing knowledge upon the child; but that it rather aims to lead him to see, to feel, and in some degree to express, the beauty and the power of color.

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February 22, 1893.

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INTRODUCTION.

THIS little book has been prepared to show the principles on which certain widely extended experiments in color instruction have been conducted in public schools during the last two years, and to suggest lines along which other teachers will find it well to proceed in their own work in various grades.

It is not put forth as a final word on the subject. Of all matters touched upon in the school-room, the development of color is one of the most dependent on observation and experiment. Scientists after long research are unable to agree in their technical theories about color itself; the present limited knowledge of the method of the development of the color-sense in children, and of the relation of that sense-development to mental growth, makes it necessary for all who are interested in the subject to feel their way gradually toward its complete educational formulation for work in the class-room. *Patient study of the child's developing sense of color under conditions of free self-activity* must soon make it possible to put public-school instruction in color, like the other fundamental studies

of form, number, language, and place, on a simple objective basis, and to develop this new study successfully by methods thoroughly educational in character.

Of one thing — the true aim and purpose of color instruction — it seems possible to be sure at the outset. That aim can be nothing less than the awakening, through cultivated sense-activity, of the child's higher spiritual powers, the opening up of new avenues of thought and enjoyment through enlarged observation of beauty in nature and in art, and the cultivation of better possibilities of usefulness to others through enlarged capability of expressing thought and feeling by the use of color materials. The object of such instruction is thus both personal culture and practical usefulness. The wise teacher who herself has eyes open to the beauty of color, and who recognizes in children, minds and souls to be nurtured as well as bodies to be fed and clothed, will find in this newly introduced study of color especially rich and suggestive opportunity for reaching the child's higher nature, and encouraging its healthy and happy growth.

COLOR INSTRUCTION.

GENERAL PRINCIPLES.

THE instruction in color which is suggested in this book is based on certain general principles which are considered fundamental. These are

I. — The Ideal Unit of Color.
II. — Color Instruction according to the Power of Color Perception in the pupils.
III. — Color Sensation before Color Names.
IV. — Simple Nomenclature.
V. — Coördination of the Study of Color with that of Form.

A general explanation of what is embodied in these principles is given in the following pages. Certain definite lines of work for the development of these principles in the regular color instruction in the schoolroom are then presented in tabular form; general suggestions as to materials and processes and a course of study follow.

I. — The Ideal Unit of Color.

Light. According to the latest investigation of scientists, light is a sensation produced by luminiferous waves of the all-pervading ether of the universe impinging upon the retina. A white light wave is heterogeneous, consisting of an assemblage of homogeneous, luminiferous waves of various lengths.

Color **Color** is a sensation caused by one or more of those homogeneous, luminiferous waves impinging on our retina. *There is no color outside of ourselves.* The length of those homogeneous waves and their combination determines the hue of the color perceived, their amplitude determines its intensity.

A wave of white sunlight is therefore the potential embodiment of all color forces.

Two phases. There are, then, two very important phases in the phenomena of color to be studied by man. The one is the nature and action of the physical forces of all color as embodied in a wave of white light; the other is the physiological effect of all color.

Study by the art educator. The study of the physical forces of color belongs primarily to the physicist; but to the art educator the study of the physiological effect and psychological influence of color is of primary importance, as all art creations in color are the result of ideal conceptions intended to influence the senses on the lines of educated color perception.

Solar spectrum.

Nature gives the solar spectrum in the rainbow; the physicist gives the solar spectrum by means of a prism, superior to nature's spectrum in intensity and stability.

Solar spectrum incomplete.

The solar spectrum is the most perfect type of a scale of color found in nature, but there are colors in nature and in pigments which cannot be found in this spectrum.

The solar spectrum gives no pure red (the red of the spectrum being distinctly yellowish), and shows none of the colors intermediate between violet and spectrum red. Again, the various colors of the scale change in appearance according to the time of day, the spectrum at sunrise differing considerably in general color from that at noon and again from that at sunset.

Ideal color unit.

Therefore, as nature furnishes no complete series of color and no stability of its types in the spectrum, this cannot be accepted as the unit of color. Nature furnishes no ideals; these must always be the creation of man.

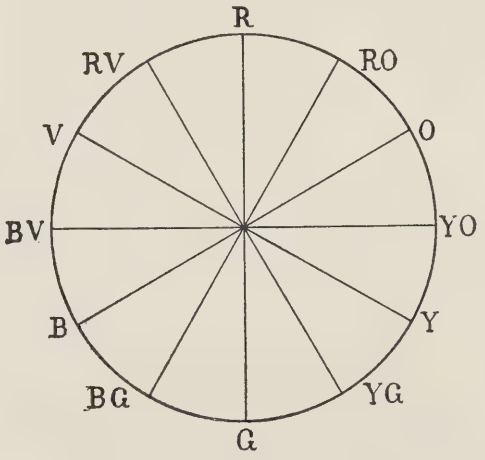
The true unit of color is formed by an idealization of all the color forces embodied in a wave of pure white light. The ideal unit of color requires a complete physical series, forming a circle or band of colors unbroken by missing links of hues. This ideal unit may be divided into any convenient number of equal intervals, these furnishing the types on which a nomenclature can be based. For practical use these ideal types have to be represented and fixed materially by the use of pigments.

Use of color.

Pigment is the only material available to man for work in the chromatic arts. The teacher of color for technical application must, therefore, start his course with single attention to color resulting from its use.

Color types.

The six leading color intervals in the color unit have been selected as principal color types: red, orange, yellow, green, blue, and violet; and six intermediate colors, as red orange, yellow orange, yellow green, blue green, blue violet, and red violet (see Miniature Color Chart No. 1, page 27). To these may be added other intermediates, such as red-red orange, yellow-yellow orange, yellow - yellow green, etc., thus graduating the progression and getting a more evident flow of color (see Miniature Color Chart No. 2, facing p. 145.



Circle of twelve colors.

A simple arrangement given above shows but twelve colors, six leading and six intermediate; by arranging these in a circle, there is obtained a progression throughout the entire physical series.

II. — Color Instruction according to Power of Color Perception.

Color perception.

Instruction in color must be based not on scientific theory alone, but also on the physiological effect of color forces on the retina. It seems to be necessary, therefore, to make the state of color perception in the child the starting-point of color instruction. It has been found by numerous experiments that little children do not perceive the darker colors as well as the lighter, brighter colors; that the color sense is with them, as with many adults, in an undeveloped state; and that some colors have for them no distinct character as colors. Hence, investigation as to the color perception of the pupils becomes an important factor in the course.

III. — Color Sensation before Color Names.

Color sensation.

Care should be taken to have the impression or sensation of a color precede its name. The color sensation must be recognized by the teacher as something distinct from the color name. Investigation in this line shows that children may associate a color name with some particular colored object, and yet fail to recognize the same color sensation in another object; hence, it is necessary to study the sensation as produced by various objects having the same color. It will be seen that what the child needs is association with, and close observation of, various colored objects to awaken his color perception.

Color sensation.

It is true that the simple color names are used considerably by children in primary grades, and that there is apparently some color knowledge; yet this should not be taken as a foundation for the instruction in color. A lesson on an individual color should not begin with the name of the color. This would be beginning with "words, not things." The exercise should be first on the color itself, not on its name.

IV. — Simple Nomenclature.

Terms.

It is very desirable that the terms used in any subject should be simple and well defined. There has been a degree of confusion with regard to some color terms, incident to the newness of the study. The more necessary terms, with their significations according to the best accepted usage, are given here: —

Standards.

Standards are the colors which by common consent have definite and permanent value as accepted types. All the colors in the list at the end of this book are standards.

Normal.

The tone of color in any given scale which is most typical of the whole scale is the **normal** tone. The normal is pure color unmixed with white or black.

Hue.

Hue[1] is the characteristic of a color that distin-

[1] Church says in his "Color: An Elementary Manual," p. 50: "The one characteristic of any color which first appeals to the eye, and first demands consideration, is its hue: we endeavor to name the color, be it red or orange, green or blue, violet or purple." See also Rood's "Modern Chromatics," pp. 36 and 39; and Von Bezold's "Theory of Color," pp. xxiii., 98.

guishes it from another color; as red, blue, green, blue violet, etc. Hue.

A **tone** is any state of a color as it passes from light to dark. Tones.

A **tint** is a tone of a color lighter than the normal tone of that color, yet retaining the same hue. Tint.

A **shade** is a tone of a color darker than the normal tone of that color, yet retaining the same hue. Shade.

A **scale** of color is the orderly progression of related tones or hues. A scale according to tone is from light to dark of one color, or *vice versa*. A scale according to hue is from one color through related colors to a color differing from the first; for instance, any part of the ideal unit — from red through orange and yellow to green, from yellow to blue, etc. There may also be scales of hue and tone combined; for instance, from the lighter tint of yellow through light yellow orange, normal orange, dark red orange, to darker red. Scale.

Positive color is decided color. The normal tones are most positive, the tints less so, etc. Color qualities.

Pure color is a term used for physical color when free from admixture with white light, or in relation to pigment color when free from admixture of white or black — full unbroken color.

Broken color is color slightly dulled. The shades and the different grays are broken colors.

Luminosity is the particular quality of light or color which gives us the sensation of more or less

Color qualities.

brightness. The luminosity of color is relative to its degree of purity; a pure color is always luminous. Yellow is the most luminous, its complement, violet, the least luminous, color in the color circle. The luminosity of any color is, therefore, relative to its position in the color unit towards those extremes.

Warm and **cold** colors: colors tending towards orange are called warm; those tending towards blue, cold. Orange is the warmest, blue the coldest, color in the color circle. Warm colors appear to partake of the color nature of sunlight and fire. Cold colors range over two-thirds of the unit of color, warm colors over one-third. Relatively speaking, we may perhaps call a yellowish blue a warmer blue when compared with one less yellowish blue. A green is never a warm color, nor is a violet a warm color, no matter how reddish or yellowish their hue may be. All brownish colors, that is, colors partaking of the red and yellow element, are called warm.

Advancing and **receding** colors: yellow being the most luminous is also the most advancing color in the color unit, and colors are called advancing or receding according to their inclination towards yellow or violet. For this reason, in a decorative design yellow must be used sparingly or broken into a dulled yellow; more of red may be used, and still more of blue. In any polychrome arrangement, the positive colors are the most advancing. In a monochrome arrangement, the strongest tone, or that which is

given the most prominence by strong contrast, is apt to be the most advancing. Color qualities.

Transparent colors are those through which the texture of an object, or an underlying color, may be seen.

Opaque colors are those which hide all underlying things. They are called body colors, and give a solid effect.

By **color affinity** is meant the relation existing between adjoining colors in the color unit, as red and red orange. Color affinity.

Complementary colors are colors which when mixed in pigments give black or neutral gray. The crude effect of complementary colors as ordinarily used in combination is spoken of under the head of "Color Contrasts," page 150. Complementary colors.

By **color value** is meant the relative power of different colors with regard to their effect upon the eye. Color value.

A color is spoken of as having great value, that is very positive in its character and of advancing quality, — a color that is assertive.

In pictorial art, the prominent features are emphasized by giving them strong color or strong tone (which may sometimes be at the same time very light, as it must depend on the general color scheme of the picture), while the surrounding color is subordinate. In decorative art, there is no motive for prominence of any part, as simplicity and repose in flat effect is desirable.

Color value.

As color is very susceptible to its environment, its value is a condition relative to its surroundings. A color which may be exceedingly strong under one condition may be very feeble under another.

The normal tone of a color is stronger than its tints and shades.

Space values.

In decoration, it is necessary to consider carefully the space values of color, so that one color will not overpower the other colors used. As colors differ in value, it is necessary to adjust the space occupied by each color to its value, giving less space to the colors that are strong in value, and more to those not so strong; so that the repose of the design will not be destroyed by an undue prominence of one color.

Color contrast.

The study of color values embraces the study of color contrast. One tone of a color may have more value than another, on account of the contrast with its surrounding or adjoining color.

In a combination containing the elements of red, blue, and yellow, it is found that owing to the strong contrast between these colors, less of yellow can be used than of red, and less of red than of blue.

By color contrast is meant the difference between two or more hues.

Color circle.

The **color circle** (page 6) illustrates graphically relative luminosity of color, cold and warm color, advancing and receding color, color values, relative color, contrasts, etc. The most luminous color is in the color circle diametrically opposite to the least

luminous; the warmest color is in the color circle diametrically opposite to the coldest; the most advancing opposite to the most receding. Color circle.

V. — Coördination of the Study of Color with that of Form.

In early education the essential aim is, or should be, to make the child acquainted with his environment. He is surrounded with objects, of which the chief visible characteristics are form and color. Through form and color, objects become appreciable to the mind. Hence, through the study of color the environment of the child is made more and more real to him. To the child, form and color are an undivided unit, and the idea of color seems to come to the child as in some way a part of form, and the form of objects is brought out through color. Form and color serve then as mutual aids to each other. Froebel recognized this, and gave as his first gift six colored balls, showing the six leading colors in connection with the most simple type-form, — the sphere. Thus color and form are introduced together in the education of the kindergarten child. Color and form.

As the first definite impressions of color in the Kindergarten are given through these balls, it is of very great importance that the colors of which they are made should be type-colors, and that the colored balls should be combined and used only in harmonious effects. Much harm may be done to the color sense by the injudicious use of these colored balls. Colored balls.

Color and form.

All exercises in color should make use of this close relationship between form and color, and should show not only parallel progression but close connection.

The study of form in decoration should be carried on to a great extent through color, as this can be done now by means of colored paper. The appearance of an object is at present studied mainly by the study and expression of its form only; but later, when the brush shall be practical in the school-room, doubtless the appearance of an object will be largely obtained through the study and expression of color as well as form, the study of the color throwing new light on the appearance of the form.

On the other hand, no means for the observation and expression of color can be devised which does not include form or shape as one of its constituent parts. Color instruction and form instruction should then be closely allied, and the work in these two subjects should be parallel, and should be so arranged that the instruction in the two subjects will be reciprocally helpful.

Moreover, through the form and color materials, all other primary work — language, number, and place — may be developed in ways that will most surely attract the child and awaken his interest.

DEFINITE LINES OF WORK.

Definite lines of work, having for their purpose the development of these principles, are now presented.

I. — **Investigation as to Color Perception.**

A. As to choice of color.
B. As to relationship of color.
C. As to the child's idea of a pleasing arrangement of color.
D. As to recognition of color.

II. — **Study for the Ideal Color Unit.**

A. Recognition of individual colors.
B. Color affinities or relations.
C. Laying colors according to relationship.
D. The chart.
E. Simple nomenclature.
F. Individual colors.

III. — **Expression, or the Use of Color.**

A. Color tablets.
B. Colored papers.
C. Pigments.

IV. — **Study of Color Harmony.**

A. Color scales of tone and of hue.
B. Color combinations of tone and of hue, coördinating with form.
(*a*) Effect of juxtaposition.
(*b*) Color values.
(*c*) Color qualities.
(*d*) Contrasts of tone and of hue.

V. — **Study of Suitable Color for Construction, Representation, and Decoration.**

The course of instruction in color in connection with the drawing-books of The Prang Complete Course shows how these lines may be carried out.

A COURSE OF INSTRUCTION FOR WORK IN COLOR

IN CONNECTION WITH THE

DRAWING-BOOKS OF THE PRANG COMPLETE COURSE IN FORM STUDY AND DRAWING.

GENERAL SUGGESTIONS.

School conditions.

In preparing this course in color, an effort has been made to consider the various school conditions of different places. An outline giving a summary of the course will be found on page 24.

As the study of color is comparatively new, and as many schools are only just introducing it, the detailed work has been so arranged that each chapter begins with a review of fundamental principles, thus enabling each year to begin on the work assigned to it. It would be better, however, in places where the color work is new, for the seventh and eighth years to begin with the work of the fourth, fifth, or sixth years.

In cities where there is not sufficient time given to do the work outlined for the first two years, the work of the last half year may be omitted.

In the detailed lessons given, the work of the sixth year in this outline is made to cover the sixth and seventh years, as very few schools are now in condition to carry out the work of the seventh and eighth years as given in the outline on page 26.

Materials.

Equipment.

Every school building should have fifty boxes of colored tablets, 50 sheets of gray cardboard, 7 × 11, to be used as a background for arrangements, and 50

pairs of scissors, — thus providing necessary material for each child in the room. Equipment.

The programmes of the various rooms may be so arranged as to give each the privilege of using the materials.

First Year.

First Half: Color tablets, Box B.

Second Half: Color tablets, Box B. Colored papers, Assortment A.[1] Color tablets and colored papers.

Second Year.

First Half: Color tablets, Box B. Colored papers, Assortment B.

Second Half: Color tablets, Box B. Colored papers, Assortment BB.

Third Year.

First Half: Colored papers, Assortment C, or Book 1 Assortment. Colored papers.

Second Half: Colored papers, Assortment CC, or Book 2 Assortment.

Fourth Year.

First Half: Colored papers, Assortment D, or Book 3 Assortment.

Second Half: Colored papers, Assortment DD, or Book 4 Assortment.

[1] A description of the assortments of colored paper will be found at the end of the book.

Fifth Year.

Colored papers.

First Half: Colored papers, Assortment E, or Book 5 Assortment.

Second Half: Colored papers, Assortment EE, or Book 6 Assortment.

Sixth Year.

First Half: Colored papers, Assortment F, or Book 7 Assortment.

Second Half: Colored papers, Assortment FF, or Book 8 Assortment.

Seventh Year.

First Half: Colored papers, Assortment G, or Book 9 Assortment.

Second Half: Colored papers, Assortment GG, or Book 10 Assortment.

Eighth Year.

First Half: Colored papers, Assortment G.
Second Half: Colored papers, Assortment GG.

Processes.

If the colored paper is folded and the design cut from it, the folding lines will show, which is not desirable. The design may be made by drawing around a pattern, on the back of the colored paper, this pattern having been developed by folding and

cutting another paper,[1] or, it may be drawn directly on the back of the colored paper. **Making.**

In making an arrangement involving a repeating unit, time may be saved by laying the paper in as many thicknesses as there are units required. By drawing the unit on the upper piece and pinning the papers together very carefully in places where the design will not be injured, the required number may be cut at one time. Great care must be exercised, however, as the strain on the thumb from cutting too many thicknesses at once may be injurious.

The children should be taught to hold the scissors easily and comfortably. In cutting long lines, the scissors should be opened widely, so that the entire length may be cut at one time. In cutting curved lines, the paper and scissors should approach each other equally, both describing the curve. In cutting around small curves into small places, it will be found necessary to use the points of the scissors, with very short cuts. Practice will give the children control of this tool. **Cutting.**

Each child may be provided with a small card upon which is deposited a drop of paste. A toothpick, or a piece of cardboard cut to a point at one end, may be used as a brush. Mucilage, gum tragacanth, flour and starch paste, and Le Page's glue will be found to work satisfactorily. **Paste.**

[1] See Paper Folding and Cutting; a series of foldings and cuttings especially adapted to kindergartens and public schools, by Katherine M. Ball: The Prang Educational Company.

Pasting.

The design should be carefully arranged in the space it is to occupy. One or two points may be placed as guides in case any of the paper should be displaced. The smallest possible amount of paste may then be applied to the outer points of the design with brush or paper. Where the unit is small, and its outline simple, the paste may be applied at the centre. After placing the design firmly on the background, a blotter or any piece of paper may be laid on the design, and the pasted places may be rubbed quite hard without moving the overlying paper. This result may be placed under some weight which will be sufficient to press it evenly until dry.

Arrangement of color work in books.

While it is necessary and desirable to have the children make the different designs in colored papers in different colors in one book, care should be taken that the colors on adjoining pages are harmonious.

Arrangement for exhibitions.

In a color exhibit, all designs of one color should be arranged in a group, and the groups arranged in the order of the ideal unit. By so doing there will be no jarring combinations, but a pleasing progression from one color to another.

Expression, or Use of Color, with Colored Tablets, Paper, and the Brush.

Expression.

This is the practical school-room question which is confronting so many teachers to-day: What shall we do in the school-room?

If the use of color is to be treated as an expression of color ideas, it must be preceded by observation of color. Such observation must proceed in regular order from colors easy of apprehension by the child to colors more difficult of apprehension. After a color is apprehended, it should be expressed, as a means of completing and affirming the apprehension. Colored papers furnish the means of color expression, which is at present the most practicable and practical in the school-room.

Expression. Color tablets. Colored paper.

In schools where the funds are sufficient to have both colored paper and water-colors, the latter will be found a valuable medium for illustrative work.

Water-colors.

The children enjoy painting very much, and will express their thoughts and tell their stories in color in a very interesting manner.

There should be, however, a good foundation laid by the study of the color tablets and colored papers before taking up the paints, as colored papers afford good standards of color desirable for the cultivation and study of color perception, whereas water-colors are desirable for color expression. The first exercise in water-colors should consist of washing in colors and their tints to match the standard colors; next a lesson in scaling the different colors according to tone, then an application of the knowledge and skill gained in a simple design; after which, twigs and leaves may be studied and color drawings made. From this the child may work into flowers and sprays, fruits

Water-colors.

and vegetables, bees and butterflies, — in fact, any object he wishes to represent.

The use of water-color and the brush.

With a brush full of clean water, obtain the full strength of color from the cake, and then transfer it to the spaces in the cover of the box, as to a palette. Add color or water as strength or delicacy of tint is required. When the color is satisfactory, apply it with the side of the brush, using only the point to keep the edges well defined. Keep the brush full of wet color, and, with the paper inclined, work gradually downward, carrying the brush across from left to right. Surplus color can be removed if taken up quickly by using a brush nearly dry, a blotting-paper, a soft cloth, or a hollow sponge.

Do not leave the brushes in the water, or put them in the mouth. When ready to put the brush away, wash it thoroughly in clean water, and give it a quick shake; this removes the water, while bringing the brush to a point, and preserves its shape. When pupils are ready to make color drawings of objects, it will be necessary for them to mix the pigments upon the palette to obtain the color desired, rarely mixing more than three at a time.

Mixing.

Beginning with the three primary pigment colors, red, yellow, and blue, we find that when mixed in correct proportions they will neutralize each other, and make gray. If any two primary pigment colors are mixed, the result will be what is known as a secondary pigment color.

Red and yellow will give orange. Mixing

Red and blue will give violet.

Blue and yellow will give green.

When the orange, green, and violet are too positive, they may be subdued by adding a little of the missing color of the triad. For instance, if the orange is too strong, and inasmuch as it is made of red and yellow, it may be subdued by adding a trifle of blue.

Red, blue, and yellow, in different proportions, will give the different grays. See page 17.

Let the children experiment in mixing, to get these effects.

For the red use carmine; blue, prussian blue; and yellow, light chrome yellow. If these are good colors, red, blue, yellow, and black,[1] give a simple palette which will prove satisfactory for work the child should do. A little practice in this work will give the child power to paint satisfactorily. Have him make repeated comparisons between the object and his work, and develop within him a desire to criticise what he has done. The result of his work will largely depend upon what he sees in the object. A simple palette.

[1] The Prang Educational Company has now in preparation a box of the very highest grade of color, containing only these four colors.

OUTLINE OF SUGGESTED COURSE.

This outline is a summary of the detailed work that follows.

First Year.

Normals.

The Six Leading Colors: Red, Orange, Yellow, Green, Blue, Violet. Gray Cardboard to be used as background.

First Half: Color tablets. — Color choice. — Color relations.
Recognition of color. — Color names.
Study of ideal color unit.
Study of individual color.

Second Half: Borders and rosettes in one tone, mounted on a very light gray or a manila paper.

Second Year.

Normal and two tints.

The Six Leading Colors, and two tints of each.

First Half: Scales of the Six Leading Colors in three tones, — normal, light, and lighter. Figures in one tone.

Second Half: Borders or rosettes in two tones.

Third Year.

Normal and two tints.

The Six Intermediate Colors: Red Violet, Red Orange, Yellow Orange, Yellow Green, Blue Green, and Blue Violet, and two tints of each.

First Half: Study of individual colors.
Ideal color unit pasted. Normal tone.
Scales of Red Violet, Red Orange, and Yellow Orange, in three tones, — normal, light, and lighter.
Figures and borders in one and two tones.

Second Half: Ideal color unit pasted. Lighter tone.
Scales of Yellow Green, Blue Green, and Blue Violet, in three tones, — normal, light, and lighter.
Rosettes and borders in two tones; in three tones.

Fourth Year.

Six Leading Colors, Red, Orange, Yellow, Green, Blue, and Violet, with two tints and two shades of each.

Leading normal, tints and shades.

First Half: Scales of Red, Orange and Yellow, Green, Blue, and Violet, in five tones.

Rosettes and borders in one, two, and three tones, using a shade.

Second Half: Ideal color unit pasted. Light tone.

Units, rosettes, and borders in one or more tones, using a shade.

Effect of juxtaposition, combining self-tones.

Fifth Year.

Six Intermediate Colors, Red Violet, Red Orange, Yellow Orange, Yellow Green, Blue Green, and Blue Violet, with two tints and two shades of each.

Intermediates, normal, tints and shades.

First Half: Scales of Red Violet, Red Orange, Yellow Orange, Yellow Green, Blue Green, and Blue Violet, in five tones.

Units in one tone; rosettes and borders in three tones.

Effect of juxtaposition, combining self-tones.

Second Half: Ideal color unit pasted. Dark tone.

Units in one tone; rosettes and borders in three tones.

Sixth Year.

Colors, the Grays. Red Gray or Russet, Orange Gray or Brown, Yellow Gray or Citrine, Green Gray or Olive, Blue Gray or Slate, Violet Gray or Heliotrope, and Neutral Gray, with two tints and two shades of each.

Grays, normal, tints and shades.

First Half: Scales of Red Gray, Orange Gray, and Yellow Gray, in five tones.

Units; borders.

Grays, normal, tints and shades.

Effect of juxtaposition, combining self-tones.
Surface covering.

Second Half: Scales of Green Gray, Blue Gray, Violet Gray, and Neutral Gray, in five tones.
Bilateral designs; borders; surface covering.

Seventh Year.

Colors: The Intermediates and Grays.

Intermediates and grays, normal, tints and shades.

First Half: Combinations of Red Violet, Red Orange, and Yellow Orange with Red Gray, Orange Gray, and Yellow Gray.
Borders, rosettes, and surface coverings.
Effect of juxtaposition; contrasting colors.

Second Half: Combinations of Yellow Green, Blue Green, and Blue Violet with Yellow Gray, Green Gray, Blue Gray, and Neutral Gray.
Borders, rosettes, and surface coverings.
Effect of juxtaposition; contrasting colors.

Eighth Year.

All Colors.

Any tones.

First Half: Ideal color unit pasted, — twenty-four colors.[1]
Scales of colors in hue and tone.
Combinations of the Six Leading Colors and the Grays in borders, rosettes, bilateral designs, and surface coverings.

Second Half: Combinations of complementaries and other contrasting colors in various arrangements; color harmony.

[1] See the Miniature Color Chart No. 2, page 00.

Facsimile in miniature with addition of Color Names.

No. 1. 12 Colors.

THE PRANG COLOR CHART.

Twelve Standard Normal Colors, completing in equal intervals the Ideal Color Unit.

For Color Education in Public Schools.



The Prang Educational Company,

Boston. New York. Chicago.

CHAPTER I.

FIRST YEAR — FIRST HALF.

Colors to be Studied.

Yellow, Orange, Red, Violet, Blue, Green.

MATERIALS. — *For the Teacher:* A sheet of colored paper, at least 4 inches square, of each of the 12 ideal unit colors found in The Prang Color Chart No. 1.[1] Materials.

For the Children: Box of color tablets (Assortment B), a sheet of gray cardboard, 7 inches by 14 inches, upon which to lay color tablets.

COLOR TABLETS, ASSORTMENT B. — The box contains 12 oblong *color unit* tablets, Red, Red Orange, Orange, Yellow Orange, Yellow, Yellow Green, Green, Blue Green, Blue, Blue Violet, Violet, Red Violet; 60 decorative tablets (tablets to be used in making arrangements), having a normal tone on one side, a tint on the other side as follows: 5 circles and 5 squares of each of the six leading colors — Red, Orange, Yellow, Green, Blue, Violet.

The gray board is to be used as a background for all the work with the color tablets.

The following exercises should be taken sequentially; they may, however, be divided or combined according to the state of color perception that is revealed in the class. Exercises.

[1] The Prang Color Chart No. 1 is 27 inches in length; it is represented in miniature on the opposite page.

Section I. — Investigation as to Color Perception.

Aim of investigation.

The aim of this investigation is to find out which colors appeal most to the children, and how the color perception grows when opportunity is given for its use. For this purpose the child is to be allowed, in the exercises given, to express himself freely, without any guidance or hint whatever as to the colors to be used, or the order in which they are to be taken.



Twelve Oblong Color Unit Tablets for Each Child.

Choice of color.

A. — One of the main points in this lesson is to utilize the delight the children have in the bright-colored tablets in leading them to an understanding of how to keep them in good order.

Give to each child a box of colored tablets.

Have the gray cardboards ready on the desk, and show the children how to open the boxes carefully,

and to turn the boxes over *away from* them so that the tablets will lie in a pile on the mounting board. Choice of color.

Let the children spread out the tablets so that they can fully enjoy them, but have it done with such care that no tablet will fall on the floor or get off the mounting board on the desk. Make this care a pleasure and not a restraint.

Ask the children to lay all the tablets of this shape ○ (showing it) in one pile, of this □ in another, and of this ▭ in another. Let them put the first two piles back in the boxes, thus leaving all the oblong color unit tablets on the cardboard, and place the box on the farther right-hand corner of the desk.

Ask each child to select the color he likes best and place it under the box. Thus there will not be much opportunity for one child to be influenced by the choice of another. Make a list of the children's names, and make a record of the choice by writing after each child's name the abbreviation of the color name: R., Red; R. O., Red Orange; O., Orange; Y. O., Yellow Orange; Y., Yellow; Y. G., Yellow Green; G., Green; B. G., Blue Green; B., Blue; B. V., Blue Violet; V., Violet; R. V., Red Violet. The Miniature Color Chart No. 1, facing page 27, shows these abbreviations in connection with the colors.

This is an important lesson, as it will show what the order of study should be for the succeeding lessons. The needs of the children can be learned only through investigation.

Playing with the tablets.

B. — Tell the children they may play with the colors and make anything they wish. Study their faces, and see what impression the colors make upon them. Observe what is done — see how many think of making a form arrangement, such as laying in a row, in a circle, in an oblong, or try to represent some familiar object. See how many think of color more than form, and make strong contrasting effects, or arrange them progressively either in groups or according to the entire color unit.

Record.

Keep a record of the result of the lesson. It will be of value in determining the succeeding lessons. To facilitate the record, a key may be made before the lesson. The record should state the number of children who make the same arrangements.

KEY.

Form Arrangement.	*Color Arrangement.*
1. In a row.	(*a*) Strong contrast, light and dark color alternating.
2. In a circle.	(*b*) Colors arranged progressively in groups.
3. In a square.	(*c*) Colors arranged according to unit, but with errors.
4. In an oblong.	(*d*) Colors arranged according to color unit correctly.
5. Representing some familiar object.	

RECORD.

Mary Smith, 1 a.
John Mason, 2 c, etc.

C. — Ask the children to lay the colors in a row on the gray board, the long sides of the oblongs touching each other, making the arrangement of color they like best. Observe how many lay a light and dark color alternating, getting a strong contrasting effect; also how many lay them progressively according to the unit, how many succeed in getting a complete unit, and at which end the failures are made. The arrangement may be broken and rearranged several times during the lesson. Observe what the children do at the second and third trial, and how much they are apt to imitate each other. Keep a record of the result, as suggested in the previous exercises.

Colors laid in a row, making pleasing arrangements.

D. — Ask the children if they have any relations. Ask them what relations are, and how we sometimes know that people are related by looking at them. Direct the question to the class in such a manner that the children will tell you that relatives are alike in some respects and unlike in others.

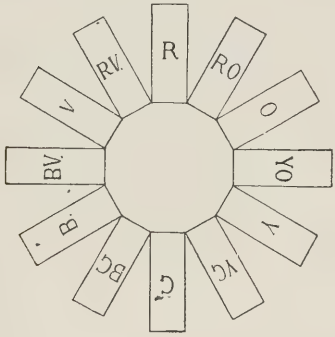
Colors laid according to their relationship.

Let the children spread out their color unit tablets. Ask if any one can see any relations in this color household. There are twelve children in this large family; they are to stand in a row, arranged according to their resemblance to each other.

Ask the children to arrange them so that those most like each other will be near together; let them select any color for the beginning. Let the children arrange the tablets, leading with different colors, as often as the time of the lesson will permit. Do not

Colors laid according to their relationship.

tell the children their arrangement is right or wrong. Keep a record of the result. When correct, they should be arranged in this order,



or in rows, as

R	RO	O	YO	Y	YG	G	BG	B	BV	V	RV

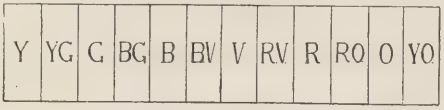
If blue is taken as the leading color, and is followed by blue green, green, etc., according to the order of the color unit, the row will end with blue violet.

B	BG	G	YG	Y	YO	O	RO	R	RV	V	BV

If yellow is taken as the leading color in the row, and is followed by yellow orange, according to the order

of the color unit, the row will end with yellow green; but if the progression is from yellow to yellow green through the unit, the row will end with yellow orange.

Colors laid according to their relationship.



The same is true when other colors lead in the arrangement.

E. — During the preceding exercises the children have become acquainted with the color family. It is now desirable to know if they recognize the individual members of this family, avoiding the mention of their names. The teacher holds up a piece of colored paper, 4 × 8, and asks the children to find that color. The child compares his tablet with the teacher's paper, and then looks about the room to see what his mates consider a match; as this work is in the line of investigation, there should be no remarks as to the success of the trial. Pursue this line of investigation[1] throughout the entire color family. Keep a record of results, specifying the number of children failing to recognize each of the twelve colors.

Perception of individual color.

[1] These investigations are being pursued by many teachers under the direction of The Prang Normal Art Classes, and blanks have been prepared for recording the results without much expenditure of time. Any teacher who is interested in making these records can obtain these blanks by writing to The Prang Normal Art Classes, 646 Washington Street, Boston.

Section II. — The Study of the Ideal Color Unit.

Development of color perception.

The aim of the exercises which have been given has been to discover what innate color perceptions children have. Attention must now be directed to the development of these color perceptions. The first study will be that of the ideal color unit. In carrying out D, **Colors laid according to their Relationship,** page 29, children will doubtless have shown some perception of the relationship of color, although they may not have completed the unit.

Relationship of colors.

A. — In order to lead the children to the perception of the ideal color unit as a whole, show them color relationship in any way possible. Although the solar spectrum does not include all the colors of the ideal unit, it shows very beautiful relationship of color; therefore it should be presented if possible. This may be done in various ways.

1. Hang a triangular prism in the window where it will catch the sunlight.
2. Place a triangular prism on a mirror where it will catch the sunlight.
3. Let a soap-bubble[1] float in the sunlight. It is beautiful to see in this wonderful airy nothing, the soap-bubble, the primal type form, the

[1] If any teachers are interested to know how much has been done in the scientific investigation of the soap-bubble, they will find the result of a great deal of study in a book entitled "Soap Bubbles and the Forces Which Mould Them," by C. V. Boys.

sphere, reflecting from its surface the solar spectrum, thus giving types of form and color in union. Relationship of colors.

4. In schoolrooms where the sunshine does not come a spectrum may be thrown upon the wall by a prism used with a lamp.
5. Show The Prang Prismatic Spectrum,[1] which represents the soft blending of the colors as seen in the solar spectrum. It will be noticed that, as this chart represents simply the solar spectrum, the red violet of the ideal color unit is not present.
6. Talk of the rainbow, find out if any one of the children have ever seen one; lead them to tell you about it, to give you their impressions. The rainbow.

If it has not been practicable to produce the solar spectrum in any of the different ways suggested, tell about the prism and the soap-bubbles and the rainbow.

Through myth and through story we learn of the messages the rainbow has brought to the world. Those which follow will all be of interest, and skilful teachers will know how to lead the children to enjoy them.

[1] The Prang Prismatic Spectrum, with the Fraunhofer lines. The space values of the colors in this spectrum are based upon measurements given by Professor Ogden Rood of Columbia College, N.Y. This is a chart 40 inches in length, adapted for the presentation of the spectrum in a large room.

The rainbow. Olympus, the home of the gods of the Greeks, was above the clouds, far above the earth. There dwelt Jupiter, king of gods and men, and there he held his court.

> "He spoke, and awful bends his sable brows,
> Shakes his ambrosial curls and gives the nod,
> The stamp of fate and sanction of the god.
> High heaven with reverence the dread signal took,
> And all Olympus to the centre shook."

The beautiful Juno was his wife and the guardian deity of women.

> "She moves a goddess and she looks a queen."

They were surrounded by other gods and goddesses who feasted each day in the palace of Jupiter on nectar and ambrosia. Iris was maid of honor to Juno and the messenger of the gods; and when they sent her down to earth, she passed with swift-moving feet through the cloud gate of Olympus, down the rainbow, to bear the celestial message to man.

"The rainbow in Norse mythology is described as *bif-rost*, the trembling bridge, timbered of three hues, whereon passed the heroes to the skies. In the German folk-lore of to-day it is the bridge whereon the souls of the just are led by their guardian spirits to Paradise."[1]

THE RAINBOW. — A RIDDLE.

JOHAN C. F. VON SCHILLER.

A bridge weaves its arch with pearls
High over the tranquil sea;
In a moment it unfurls
Its span, unbounded free.
The tallest ship with swelling sail
May pass 'neath its arch with ease;

[1] "The Tree of Mythology," by C. D. B. Mills. Published by C. W. Bardeen, Syracuse, N.Y.

The rainbow.

It carries no burden, 'tis too frail,
And when you approach it flees.
With the flood it comes, with the rain it goes;
What it is made of nobody knows.

It was the bow of promise to the ancient Hebrews. "I do set my bow in the clouds, and it shall be for a token of covenant between me and the earth." — *Gen.* ix. 13.

So heavenly toned, that in that hour
From out my sullen heart a power
Broke, like the rainbow from a shower,
To feel although no tongue can prove
That every cloud, that spreads above
And veileth love, itself is love.

— TENNYSON: *The Two Voices.*

It is now a bow of promise to us, telling us always of the sunshine somewhere after the shower. With its wondrous arch it spans the skies, giving us again beautiful form and beautiful color, though veiled. And so, as of old, it bears a message from heaven to earth, — a message of beauty.

. . . "A link that binds us to the skies,
A bridge of rainbows, thrown across the gulf of tears and sighs."

— COLERIDGE.

Relationship of color.

In dewdrops and in gems this beautiful relationship of color is wonderfully displayed.

THE OPAL.

BY EDITH M. THOMAS.

Iris dwells in thee and throws
Rays of leaf-green and of rose,
Limpid amber courseth through
Violet glooms of fading hue.

Relationship of color.

The same relationship may be found in the many hues of coal, in the play of color frequently seen on steel, in the iridescence of shells, in the lustre from brilliant insects, and in the plumage of birds.

THE COCKATOOS.

By Celia Thaxter.

And nobody spoke and nobody stirred
Except a bird that sat by a bird —
Two cockatoos on a lofty perch,
Sober and grave as monks in a church.
Gay with the glory of painted plume
Their bright hues suited the brilliant room;
Green and yellow, and rose and blue,
Scarlet and orange and jet black, too.

— *St. Nicholas*, September, 1892.

Recognition of color.

B. — The thought now is to have the children recognize the individual color. Let the children take out the color unit tablets and spread them on the gray board. Let the children look carefully at the teacher's color, then look about the room and see what the other children are holding up. When any child fails to make the match, go to him, holding the color where he can place his beside it. If he still fails to make the match, do not force his seeing it, but leave the development of the color sense for another lesson; the seed sown will bear fruit in good season. Present other colors to be matched, two or

more, in the order of the preference of the children, as discovered in A, **Choice of Color,** page 28.

Recognition of color.

C. — Hold up a sheet of colored paper, red for instance; have the children find the color among their tablets and lay it on the gray board. Ask the children to place beside it the color that looks most like it. Some may select the red orange, while others the red violet — both being correct. In the event of many failing, have them take their first tablet and place it beside each of the others until they find its nearest relation. Do not wait for every child to get this, but take up another color.

Color relationship between two colors.

Remember that this work must not be made mechanical, and must not be in any way forced. While some children may more readily detect a relationship between some colors, other children may find it with other colors. Sometimes we find that, while failing on a color in the beginning of a lesson, they will see it clearly at the close of the same lesson, or if not, then at the second or third succeeding lesson. These lessons need not follow each other immediately.

It may take several lessons to study the immediate relationship of the different colors; yet it would not be advisable to spend much time on the green, blue, and violet end of the color unit, as it has been learned by experiment that the eye of the child is not sufficiently developed to distinguish clearly between these colors. The color perception of these colors must be a growth.

Color relationship between three or more colors.

D. — Having studied the relationship existing between two colors, have the children arrange them in groups of three; for example, the selected color, yellow, has two immediate relations: place one on the left, as yellow orange, and the other on the right, as yellow green. If blue is selected, its two immediate relatives would be blue green on one side and blue violet on the other.

Thus far the children have not been taught any color names; they only know color sensations, and can only express themselves by holding up or placing the color they wish to use. Have the children arrange different groups wherein the different colors are the leaders, and endeavor to give equal attention to all the colors until the weak places have been discovered; then give special attention when it is needed.

Ideal color unit. Color Chart No. 1.

E. — Have the children arrange their color family in a row in the order of their relationship, using any color as a leader, — in a row, from left to right or from front to back, or in a circle. If there happens to be a place where they fail to arrange the colors progressively, give special attention to color relationship of those colors, and then return to the ideal color unit.

Finally, show The Color Chart No. 1, and let the children compare their arrangement with that on the chart. Do not endeavor to force the seeing of any relationships. The power to see will come as the color sense develops.

SECTION III. — **Investigation as to Perception of Color and of Color Harmony, and as to Knowledge of Color Names.**

MATERIALS. — *For the Teacher:* A sheet of colored paper, at least 4 inches square, of each of the six leading colors.

For the Children: Box of colored tablets (Assortment B), sheet of gray cardboard.

Twelve Color Unit Tablets for Each Child.

Choice of color.

A. — Repeat A, **Choice of Color,** page 28. Make a record of this choice and compare it with the record of the first choice.

All the Decorative Tablets.

Children's arrangements with decorative tablets.

B. — In the work previously given the children have used only the color unit tablets. The circle and square having now been developed in their form lessons, the decorative tablets of these shapes stand as a mediation between the form and color.

Let the children now take out of their boxes the tablets not yet handled and make any arrangements they wish. In all this color work, give the children ample opportunity for arranging the colors according to their own ideas. Observe the arrangements; note how many arrange all of one shape in a group, how many arrange all of one shape in rows, in circles, in oblongs, or to represent familiar things. See how many arrange them as to color — progressively, in rows, circles, etc. — or in arrangements of contrasting colors,

Children's arrangements with decorative tablets.

and note whether the greater number arrange as to form or as to color. Note also the arrangements made as to form and color both; for instance, all red circles in a row, all red squares together, etc.

All the Decorative Tablets for Each Child.

Knowledge of color names.

C. — It is desirable now to know how many of the names of the six leading colors — yellow, orange, red, violet, blue, green — are known by the children. The object being simply to discover how much the children know, no effort should be made to teach color names.

Hold up a sheet of yellow paper and ask the children to find among their circles and squares a tablet of the same color. Ask how many know its name. It might be well to have the children whisper the name to the teacher to see whether they really do know it. Children imitate very closely, and if one should speak a color name aloud, the entire school would immediately repeat it. If, after this investigation has taken place, the knowledge of the name seems quite general, it might be well to have some child give the name to the school. Test the knowledge of the names of the remaining colors in the same way, and keep a record of the results to serve as a guide in succeeding exercises.

If the children seem to know the names quite well, a little exercise like the following might be given for associating still more strongly the color names with

the color sensations. Have the children place a red tablet at the upper left corner of the desk, yellow at the lower left, orange half-way between, violet at the upper right corner, green at the lower right corner, and blue half-way between. Many modifications of this exercise will suggest themselves to teachers. Knowledge of color names.

SECTION IV. — Study of Individual Color.

MATERIALS. — *For the Teacher:* The Prang Color Chart No. 1, one sheet of each of the six leading colors.

For the Children: Box of colored tablets (Assortment B), sheet of gray cardboard.

Contents of the Box for Each Child.

A. — Let the children take out the entire contents of the box and place all the tablets of the same color in a pile, having thus a pile of each of the six leading colors, and six tablets — red orange, yellow orange, yellow green, blue green, blue violet, red violet — which do not belong to any of the piles. Let them place these six tablets at one side, and arrange the tablets in each pile according to shape, thus making first a pile of circles, at the right of it a pile of squares, and at the right of the squares an oblong, of each color. Arranging contents of box according to color and form.

All the Decorative Tablets.

B. — Let the children arrange all the decorative tablets of the same color in a group, placing them so Difference in the faces.

Difference in the faces.

that the face of each tablet can be plainly seen. The teacher can then see at once whether the normal tone or the tint is displayed. Do not speak of the light tone as a tint at this time, but ask the child if the tablets look just alike; if he finds they do not, ask him to see if he can make them all alike. Let him find out for himself that the faces of the tablets are different. After the tablets are arranged in groups, ask the children if they can name the color in each group. If there is any time, the children might make arrangements about a centre or borders.

Yellow Decorative Tablets.

Study of individual color. Yellow.

C. — The study of individual color affords opportunity for much individuality on the part of the teacher. Experiments as to the children's choice of color have shown a preference for the orange series, yellow receiving the greatest number of votes; hence it is well taken for the first exercise.

Before the lesson, distribute yellow objects thoughtfully about the room. Let the children spread their tablets on the cardboard. Hold up the yellow paper and ask the children to find all the tablets of that color, placing the remainder in the box, then to look about the room and find things of the same color, — a necktie, a hair ribbon, a bow, a stripe in a dress, a flower, a figure in the carpet on the platform, the color in a picture, or decoration on the wall. Give the name **yellow** if not already known, and call for its use.

Yellow.

Ask the children to name some object that is yellow. The dandelion, the yellow primrose, the daffodil, the buttercup, the cowslip, the sunflower, the goldenrod, and some pansies, as well as leaves, and the centres of many flowers, will probably be given.

Among fruits the lemon, the yellow banana when ripe, some pears and some apples, some cherries and some plums, may be mentioned.

Birds and butterflies and moths are touched with this luminous color. Among vegetables ripe corn, yellow beans, yellow tomatoes are found. In minerals there are brass, gold, amber, topaz. Yellow abounds in the sunset. Among manufactured articles there is no end to the things in which yellow may be found.

Request the children to bring some bit of material that is yellow, — a piece of ribbon, or silk, or cotton, or woollen, or paper, or worsted, — or something containing a yellow figure. If it is in the fall, almost every child can bring a beautiful yellow leaf. These may be compared with the yellow on the tablets without asking for a close discrimination. The child may say, "My yellow is lighter or darker, or brighter or duller."

A good suggestion is to have a "yellow week," during which the teacher and children, as far as possible, wear a bit of yellow ribbon or a yellow flower, and fold or cut something of yellow paper, and learn a verse or two in which the color is named. Many such as those following will be found in collections of children's poems and in the illustrated magazines.

Yellow.

DANDELION.

By W. B. Allen.

A dandelion in a meadow grew,
 Among the waving grass and cowslips yellow;
Dining on sunshine, breakfasting on dew,
 He was a right contented little fellow.
Each morn his golden head he lifted straight,
 To catch the first sweet breath of coming day;
Each evening closed his sleepy eyes, to wait
 Until the long, cool night had passed away.
One afternoon, in sad, unquiet mood,
 I paused beside this tiny, bright-faced flower,
And begged that he would tell me, if he could,
 The secret of his joy through sun and shower.
He looked at me with open eyes, and said:
 "I know the sun is somewhere shining clear,
And when I cannot see him overhead,
 I try to be a little sun, right here!"

— *St. Nicholas*, September, 1882.

THE DANDELIONS.

By Helen Gray Cone.

On a showery night and still,
 Without a word of warning,
A trooper band surprised the hill,
 And held it in the morning.
We were not waked by bugle notes,
 No cheer our dreams invaded,
But at the dawn their yellow coats
 On the green slopes paraded.

Yellow.

We careless folk the deed forgot
 Till one day, idly walking,
We spied, upon the self-same spot,
 A crowd of veterans, talking.
They shook their hoary heads and gray,
 With pride and noiseless laughter,
Till, well-a-day, they blew away,
 And ne'er were heard of after.

THE YELLOW PANE.

By Walter Learned.

When overhead the gray clouds meet,
 And the air is heavy with mist and rain,
She clambers up to the window seat,
 And watches the storm through the yellow pane.

At the painted window she laughs with glee,
 She smiles at the clouds with a sweet disdain,
And calls, "Now, papa, it's sunshine to me,"
 As she presses her face to the yellow pane.

Dear child, in life should the gray clouds roll,
 Heavy with grief, o'er thy path amain,
Stealing the sunshine from thy soul,
 God keep for thee somewhere a yellow pane!

— *St. Nicholas*, July, 1882.

Yellow Circular Tablets.

Arrangements of yellow tablets. Borders.

D. — Let the children take the yellow circles from the box. Dictate the following arrangements: — Arrange the circles in a row, on the gray cardboard,

Arrangement of yellow tablets. Borders.

in any way you wish. Arrange in a row circles close together but not touching. See Plate 1, Fig. 2. Arrange in a row far apart. See Plate 1, Fig. 3. Arrange the tablets in a row by twos. See Plate 1, Fig. 4. Arrange in a row by threes. See Plate 1, Fig. 5.

Orange Decorative Tablets.

Study of individual color. Orange.

E. — As orange is another favorite of the children, and inasmuch as it is a modification of yellow, — the yellow progressing into the orange in the color unit, — it will be taken next. Present orange as yellow was presented. After the color sensation is fixed, give the name **orange**. Although this is a color less commonly mentioned than yellow and apparently less known, yet it is a color coming very often into the child's experience, and the name is strongly connected with the color by its use for that favorite fruit, the orange; therefore the name is easily remembered. Their associations with the color are most delightful, for it stands to them as a symbol of the fragrant, juicy, refreshing fruit.

This bright color appears frequently in nature. In the brilliant sunset it is the most prominent color. In the autumn the forest gives it in abundance. It is seen in the fire, when it is as active as the leaping flame, constantly changing its tone until it merges into its black cap of smoke. Orange is very self-assertive and aggressive.

EXAMPLES OF WORK IN COLORED PAPER.

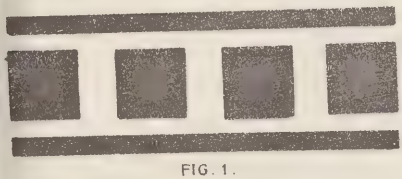


FIG. 1.

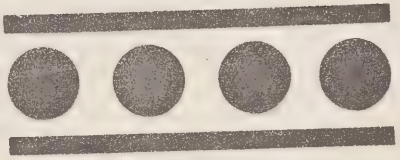


FIG. 2

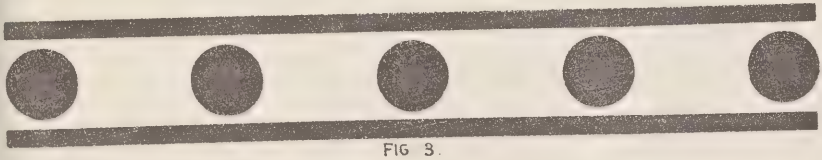


FIG 3.

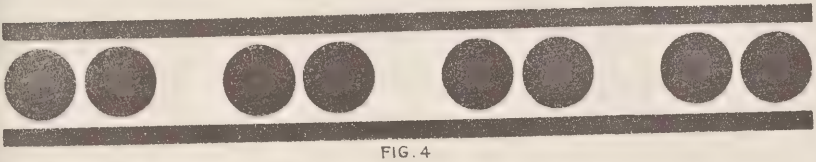


FIG. 4

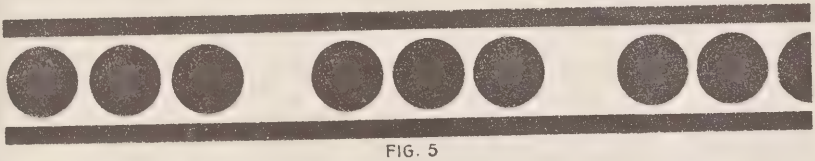


FIG. 5

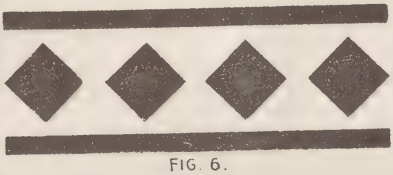


FIG. 6.

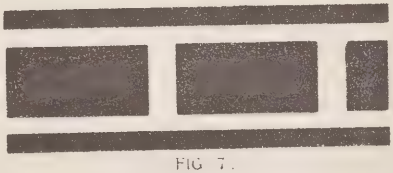


FIG 7.

Study of individual color. Orange.

Nature gives many birds and butterflies a touch of it. The yolk of the egg is a very rich orange. The half-ripe berries of the mountain ash, the full and open berries of the bitter-sweet, the graceful celandine, the marigold, the coreopsis, the zinnia, the nasturtium, all glow with this bright color; it will be a double delight if the children can bring that common wayside flower, "butter and eggs," in which their old friend yellow, and their new friend orange, are combined. Perhaps some of them may remember seeing the pumpkin and the squash and the carrot. They will enjoy bringing bits of orange-colored material and comparing them with the type given them on their colored tablets.

Orange Square Tablets.

Arrangements of orange tablets and borders.

F. — Let the children take the orange square tablets from the box. Dictate the following arrangements: —

Arrange in a row, on the gray board, squares on the side, leaving small spaces between them. Arrange in a row, squares on the side, far apart. Arrange in a row, squares on the corner, close together but not touching. Arrange squares on the corner, far apart. Arrange in twos and threes both squares on the side and squares on the corner. See Plate 1. Arrange in a row in any way you wish.

Red Decorative Tablets.

Study of individual color. Red

G. — Inasmuch as orange progresses into red, this color will be studied next and presented as yellow was in C. After the color sensation is fixed, give the name **red,** and practice in its use. Red is found to be one of the colors best known by children and adults, male and female. This is probably owing to the fact that it excites the pleasant sensation of warmth and brilliancy, while not being aggressive, and also is associated with many things which give satisfaction to the other senses.

The red apple is always preferred to the green one. Red cherries and red strawberries are a delight to every child. The radish has some very pretty color, and with the tomato gives variety to the color of the table. Among flowers are found a great variety of roses, verbenas, geraniums, carnations, — all red. Tulips are so variegated that frequently the color passes from yellow to red.

In the sunset nature paints the sky with various reds, in combination with orange and yellow. A close view of fire will reveal some beautiful color. The ripened foliage gives us many beautiful tones of red, blending into browns and orange. The ruby and garnet are good examples of red from the mineral kingdom.

On the plumage of birds are some beautiful bits of color. Every one knows "Robin Red Breast," and the red spot on the woodpecker's head.

Study of individual color. Red.

THE SWEET RED ROSE.

By Joel Stacy.

Good-morrow, little rose-bush,
Now prythee tell me true,
To be as sweet as a sweet, red rose,
What must a body do ?

To be as sweet as a sweet, red rose,
A little girl like you
Just grows and grows and grows — and grows,
And that's what she must do.

— *St. Nicholas*, August, 1882.

Have the children bring bits of red material from home for comparison.

While the children are studying the various reds, the normal red on the tablets or colored paper should frequently be referred to, thus fixing the type, and detecting any deviation from it.

Red Decorative Tablets.

Arrangement of red tablets. Borders.

H. — Let the children find all the tablets in red. Dictate the following arrangements : —

Arrange first circles, then squares, close together, far apart, as to number in twos and threes. See Plate 1.

Arrange circles and squares alternating, first a circle alternating with a square on its side, then with a square on its corner. Arrange squares on the side,

Arrangement of red tablets. Borders.

alternating with squares on the corner. See Plates 1 and 3. Arrange in any way you wish.

Violet Decorative Tablets.

Study of individual color. Violet.

I. — Next to red, the color related to it will be studied. Have the children tell which color, among those not yet studied, is most like it, and present violet as yellow was presented, giving the name **violet,** after the color sensation is fixed. Violet is a color name intimately associated with the flower of that name. All children that have had the sweet privilege of roaming in the woods in the spring-time know the little blossom well.

"Sweet Violets! Who will buy?"

The lilac, iris, pansy, heliotrope, morning-glories, asters, chrysanthemums, give many modifications of the beautiful, refined color.

Among precious stones violet occurs in the amethyst. Violet on the plumage of birds is rare. Nature is lavish with her violet in painting her clouds, and the mid-distant hills on a warm, hazy day are frequently quite positive in this color. Large bodies of water frequently appear to be violet. A very good method of deciding the hue of a color in nature that is not very positive, is by comparison with its neighboring colors. Look at the blue sky in the zenith for several seconds, then look at the

water, and that which before looked blue will by contrast become violet. The same may be applied to the coast-line beyond or distant hills. Study of individual color. Violet.

Owing to the receding quality of this color, it has been found to be one of the most difficult to perceive, therefore the children should have considerable practice in using the violet tablets, and comparing any contributed specimens of this color with the type given them on the tablets.

Violet Decorative Tablets.

J. — With the violet tablets review arrangements for borders, first with circular tablets, then with square tablets, and then alternating the circular and square tablets, and then in any way the children wish. Arrangement of violet tablets. Borders.

Encourage children in all this work to the freest expression of their own ideas. Study such expression carefully, and call attention to that which is good.

Red and Violet Circular Tablets.

K. Rosettes. — Ask the children if they can make something like a rose from their red tablets. Do not tell them how many to use. Study closely what they do. Observe how many "rose-leaves" they use to make the flower. See how many of the children use a centre. Rosettes.

Ask all of the children to make something like a

Rosettes.

rose, having only four "leaves" or petals. If the children have not shown that they feel the need of holding the "leaves" of their flower together, lead them to see that the flower is not complete without a centre, and ask them how they can make the flower look whole and strong, like those that grow out-of-doors where the wind can blow them about.

In leading the children to appreciate the need of a centre for their arrangements, it is not necessary to call their attention to the fact that a difference in color is generally found between the "leaves" of a flower and its centre. The general idea of a flower is a bit of red or yellow or blue, and the arrangement which is to be made is to be a whole, a unit in form and color, and therefore it should be made in one color. If the children are not led to observe details, they will make their "red, red rose" of the same color, heart and all.

It will readily be seen that an arrangement having the central figure of a different color from that of the repeats will not be a mass or unit of color, but five separate bits of color, four around a different central one.

The arrangement which the children have made, while not a real rose, since it has only four petals, is somewhat like a rose; and, because the rose is liked so much and is so often used to "trim" or beautify things, this arrangement resembling a rose is called a rosette — a little rose — and may be made of any color. Let the children lay a rosette of violet tablets.

Yellow, Orange, and Red Circular Tablets.

Dictation. Rosettes.

L. — Let the children lay four circular tablets about a centre, touching, by edges; again lay the four tablets, edges touching, and place the central tablet on top; again, arranging four tablets not touching, but with about one-eighth of an inch between them, lay the central tablet on top. The centre will cover a trifle more than a third of the diameter. Ask the children which arrangement they like best. They can be led to see that the first arrangement looked as if it was not securely held together, and might fall apart, that the second looked crowded, while the third seemed to have its parts distributed comfortably. See Plate 2.

Blue Decorative Tablets.

Study of individual color. Blue.

M. — The color found next to violet in the ideal color unit is blue. Present **blue** as yellow was presented. What child does not know that the sky is blue? Have you seen the distant hills, a perfect match to the sky? Water will often reflect the pure blue of the sky.

How many children have been asked: Where did you get those blue eyes? or have been told that they matched the necklace of turquoise beads. Among flowers they may have plucked the forget-me-not, the fringed gentian, blue bells, bachelor's buttons, and morning glories, and have been delighted to find that the bluebird that flitted by them was even a

Study of individual color. Blue.

trifle more brilliant in hue than their nosegay. Our flag that decorates the school room may play a part in this lesson. Here the red means valor, the white purity, and the blue loyalty, three elements which must enter into the character of every patriotic citizen.

Blue Decorative Tablets.

Arrangement of Blue Tablets. Rosettes.

N. — Dictate the following arrangements:

Make a rosette of blue circular tablets, having four repeats, and a circular centre, then a similar rosette with square centre, making the first arrangement as if in a square resting on its side and the other as if in a square on its corner. See Plate 2.

Make a rosette having square repeats, first with a circular centre, then with a square centre, making the first arrangement as if in a square resting on its side and the other as if in a square on its corner. See Plate 2, Figs. 12, 13.

Green Decorative Tablets.

Study of individual color. Green.

O. — The last of the six leading colors is **green,** which should be presented as yellow was presented. It is the color which is most prevalent, but which seems to affect the children least. This is probably owing to the fact that it is not assertive nor aggressive, but quieting and soothing in its effect. The green of the grass and the trees is most grateful.

EXAMPLES OF WORK IN COLORED PAPER.

PL 2.

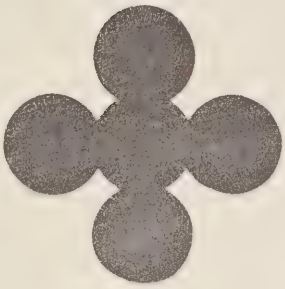


FIG 8.



FIG. 9.



FIG. 10.



FIG. 11.

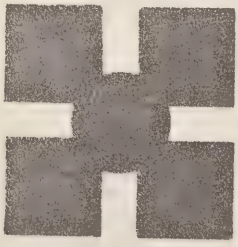


FIG. 12.

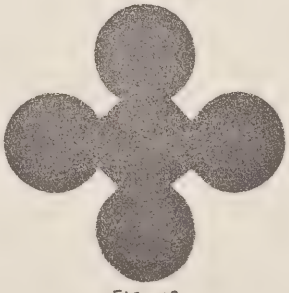


FIG. 13.

Beautiful greens are found on the wings of flies and beetles. The coats of lizards and snakes give some brilliant coloring. Among birds there is much color that is changeable from blue to green. The eye of the peacock's feather and the plumage of the humming-bird are good illustrations, while "Pretty Poll" is satisfied to have her coat made of green pure and simple, with occasional touches of red and blue.

Study of individual color. Green.

Green Decorative Tablets.

P. — Review arrangements for borders and rosettes and let the children make original arrangements with the green tablets.

Arrangement of green tablets. Borders and rosettes.

All the Decorative Tablets.

Q. — Let the children take out all the decorative tablets and arrange them as they please. Notice how they are arranged, especially with reference to any combinations of color.

Children's arrangements.



CHAPTER II.

FIRST YEAR — SECOND HALF.

Colors to be Especially Studied.

Red, Orange, Yellow, Green, Blue, Violet.

MATERIALS. — *For the Teacher:* A sheet of colored paper, at least 4 inches square, of each of the 12 ideal unit colors; The Prang Color Chart No. 1.

For the Children: Box of color tablets (Assortment B), gray cardboard, upon which to lay color tablets, colored paper (Assortment A), manila or gray paper for mounting. In handling the assortments of colored paper, it is best to remove all the paper at first, and then to return all that is not required for the exercise.

SECTION I. — Investigation as to Color Perception.

Twelve Color Unit Tablets for Each Child.

Color choice.

A. — Have the children remove the oblong tablets from the box, spread them out on the gray board, look carefully, and make a choice. Keep a record of this result (see A, **Color Choice,** pages 28, 29); compare this result with their first choice.

Color perception.

B. — Review E, **Color Perception,** page 38, and if necessary take up B, **Recognition of Individual Color,** page 37.

Color relationship.

C. — Review C and D, **Arrangement and Relationship of Colors,** pages 31, 32, 33, and if necessary take up C and D, **Relationship of Colors,** pages 39, 40.

Ideal color unit.

D. — Ask the children to lay the ideal color unit horizontally, vertically, and in a circle, beginning with any color. Having done this, ask the children to tell you where in nature such an order of color may be found. They may speak of the rainbow. This will lead up to a review of the rainbow, as found in A, **Relationship of Colors,** pages 34–37.

The solar spectrum may be thrown on a white wall, thus giving the children an opportunity of seeing this beautiful order of ethereal color.

"Like the bow in the cloud that is painted so bright."

All the Decorative Tablets.

Color names.

E. — Investigate as to knowledge of color names, as in C, **Knowledge of Color Names,** page 42.

SECTION II. — Study of Individual Color.

Red Decorative Tablets.

Review of individual color. Red.

A. — The children now having become acquainted with the arrangement of the colors in the band of the ideal color unit, the colors may be taken up in order, beginning with red.

"Like winter apples, red of hue."

Review of individual color. Red.

Review G, **Study of Individual Color, Red,** page 50. Have the children find all the red decorative tablets in the box, and make any arrangements that they like. Be careful to have the normal tone used, instead of a tint. After they have had the opportunity of making any arrangements they wished, an arrangement from Plates 1 and 2 may be dictated to them, or sometimes drawn on the board for them to copy.

Making borders and rosettes from colored papers.

B. — The children may cut free-hand,[1] from the colored paper, the repeating figures, to be used either in a border or a rosette, or they may cut one figure free-hand, from manila paper, and use this manila figure as a pattern, laying it on the back of the colored paper and drawing around it, as often as repeats are required for the arrangement, and then cut on the drawn lines. For cutting, see General Suggestions, page 22. The centre for the rosette may be made in the same way.

Border.

In making a border, the units having been cut and the strips having been cut or supplied, the children may make an arrangement with tablets (see D, F, and H, **Arrangements,** pages 47, 49, 51 and so on). Then they may place the strips and units of colored paper in the space the arrangement is to occupy. They may paste the upper strip first, then the units, beginning at the left end and taking them up in their order, leaving the lower strip until last.

[1] The free-hand cutting gives admirable training, leading to a very fine and ready appreciation of shape.

Rosettes.

The units and centre for the rosette having been made as suggested, the children may make their arrangements (see K, **Rosettes,** pages 53, 54).

After the arrangement has been carefully made the space values[1] of units, centres, and open spaces should be considered, the centre may be removed and, without disarranging the design, each unit may be pasted separately, beginning at the upper left, taking next the upper right, then the lower left, and last the lower right.

When the repeats have been fixed, the centre may be added. When the unit is small, one bit of paste in the centre will be sufficient to hold it in place.

In pasting a strip, a bit of mucilage may be applied to the left end and that fastened, then to the centre, and then at the right end. For further directions for pasting, see General Suggestions, pages 22 and 23.

[1] Here the space values alluded to are mainly those of form and have reference to the following general rules: —

1. Two-thirds of any space to be decorated should be covered by the design.

2. The central figure should be sufficiently large to hold the parts together so that the arrangement may seem to make a whole. The central figure should also overlap the units sufficiently to give a sense of stability.

3. The parts of a design must be well distributed over the space to be decorated, *i.e.*, so that there will not seem to be a lack of figures in one part and too great a number in another part.

Box of Tablets. Red Paper, Normal Tone.

Border. Red paper.

C. — As the sphere is the first solid studied, the circle which it suggests should be the first tablet; therefore the first border is made with the repeating circle.

Have the envelopes containing the colored paper distributed. Let the children take out all the color material from the envelope and lay it out carefully. Talk to them about the care of the material. Ask them to find the red sheet, and to lay it out at the side. Show them how to put the other sheets back into the envelope very carefully.

Let the children cut from *each* long edge of the sheet of red paper, *free-hand*, a strip about $\frac{1}{4}$ inch in width.

Have the children take out the red circular tablet, study carefully its size and shape, and cut five circles free-hand from the remaining strip of paper.[1] In cutting a circle free-hand, it is well to turn the paper slightly toward the scissors while cutting, as this movement aids in producing the curve.

Or they may cut patterns from manila paper as true as may be expected from their age and experience, and then cut the five circles from the strip of red paper remaining, by this pattern. In using the pattern, they should consider the economic use of the paper.

[1] It will be well to precede this exercise by practice in cutting units and strips from manila paper.

Or they may place the red circular tablet upon the red square tablet, and compare them and tell how a circle may be cut from a square. Then they may cut five squares from the remaining strip of red paper, and cut circles from the squares by rounding off the corners. Border. Red paper.

Let them then arrange the units and strips which they have cut in a pleasing order through the centre of the space the arrangement is to occupy, carefully study the whole effect, and then paste the arrangement.

Orange Decorative Tablets.

"The oriole above his swinging nest
In the gnarled pear-tree plumes his orange coat."

D. — Review E, **Study of Individual Color, Orange,** pages 48, 49. Have the children find all the orange decorative tablets in the box, placing them on the gray board so that the normal tone is visible. Have them make such arrangements for borders and rosettes as are suggested in D, F, H, and K, **Arrangements for Borders and Rosettes,** pages 47, 49, 51, 53. Review orange.

Orange Paper, Normal Tone.

E. — Having made a border using the circle cut from red paper as a repeat, let the children cut, from the strip of orange paper, five squares, *free-hand.* Let them cut circles from the five squares *free-hand,* arrange the circles in a rosette, study the Making of rosettes in orange paper.

Making of rosettes in orange paper.

whole effect, and paste them in the middle of a sheet of paper. See Plate 2, Fig. 8.

The circles may be cut by a pattern as suggested in C, **Border, Red Paper,** page 62, if preferred.

Yellow Decorative Tablets.

"Welcome, yellow Buttercups!"

Review yellow.

F. — Review C, **Study of Individual Color, Yellow,** pages 44–48, and have the children make arrangements for borders and rosettes, using the normal tone of the yellow decorative tablets.

Yellow Paper, Normal Tone.

Making border of yellow paper.

G. — In the sequence of work in form study, the cube is the second solid studied; this suggests the square for our next repeat.

Let the children cut $\frac{1}{4}$ inch strips from each long edge of the strips of yellow paper. Let them cut five squares, *free-hand*, from the remaining strip, arrange them with the $\frac{1}{4}$ inch strips for a border, and paste the border on a sheet of paper, placing it well before pasting. See Plate 1.

Have the children cut free-hand a one-inch square, which they may use as a pattern for making the units; arrange these with strips for a border, study the arrangement as to space values as in B, **Rosettes,** page 60, and paste as directed.

Green Decorative Tablets.

"The gay green grass comes creeping
So soft beneath their feet."

Review green.

H. — Review O, **Study of Individual Color, Green,** pages 56, 57 and have the children make arrangements for borders and rosettes, using the normal tone of the green decorative tablets.

Green Paper, Normal Tone.

Making rosettes of green paper.

I. — Have the children make and paste rosettes of green paper, having square units, using either a square or a circle for the centre piece. The units and centre should be the full width of the strip. See Plate 2, Figs. 10, 11, 12.

Blue Decorative Tablets.

"But then out comes the flax-flower
As blue as is the sky."

Review blue.

J. — Review M, **Study of Individual Color, Blue,** pages 55, 56, and have the children make arrangements for borders and rosettes, using the normal tone of the blue decorative tablets.

As the cylinder is the next solid in the sequence of our form study, the oblong, which is suggested by the cylinder, now claims attention. By placing two square tablets side by side the oblong is obtained. Borders may be made by repeating the oblong, or by alternating it with the circle or square.

Review Blue.

It will be difficult to make a pleasing rosette using only oblongs, hence it will be necessary to use the circle or square, for a rosette, as in Plate 2.

Blue Paper, Normal Tone.

Making border of blue paper.

K. — Have the children make and paste a border of blue paper, using oblong repeats, or an alternation of oblong and circular repeats or of square and circular repeats, according to methods given. See Plates 1 and 3.

Let the children cut a marginal strip $\frac{1}{4}$ inch from each of the long edges of the blue strip of paper. Let them think what they could cut from the remaining strip. They could cut two oblongs 1×2 inches, and three squares, or three oblongs 1×2, and two squares, or four oblongs 1×2. They could then cut circles from the squares by rounding the corners.

Violet Decorative Tablets.

"Down in a green and shady bed
A modest violet grew,
Its stalk was bent, it hung its head,
As if to hide from view."

— JANE TAYLOR.

Review violet.

L. — Review I, **Study of Individual Color, Violet,** pages 52, 53, and have the children make arrangements for borders and rosettes, using normal tone of violet decorative tablets.

EXAMPLES OF WORK IN COLORED PAPER.



FIG 14.

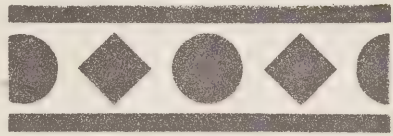


FIG 15

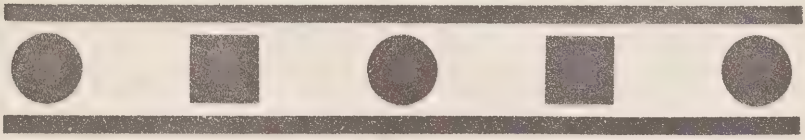


FIG. 16.

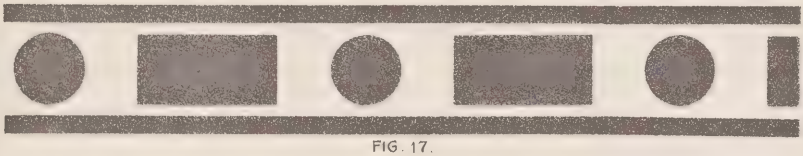


FIG. 17.

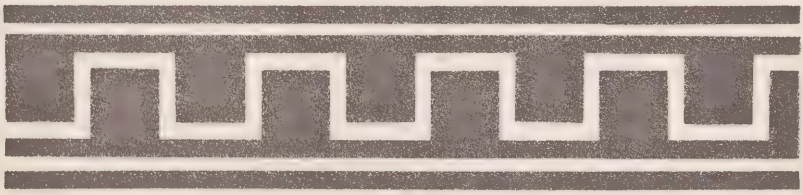


FIG. 18.



FIG. 19

Violet Paper, Normal Tone.

M. — Have the children make and paste rosettes of violet paper, according to the methods given. They may make any of the arrangements on Plate 2. **Making rosettes of violet paper.**

The children should plan the work, but at the same time their planning should be wisely directed.

"Busy and happy child,
Working with colors gay;
Do your best, your very best,
And do it every day.

"For he who always does his best,
His best will better grow;
But he who shirks or slights his task,
He lets the better go."



CHAPTER III.

SECOND YEAR — FIRST HALF.

Colors to be Studied.

Red, Orange, Yellow, and two tints of each.

MATERIALS. — *For the Teacher:* A sheet of colored paper, at least 4 inches square, of each of the six leading colors and their two tints.

For the Children: Box of color tablets (Assortment B), gray cardboard upon which to lay color tablets. Colored paper (Assortment B), manila or gray paper for mounting.

SECTION I. — **Investigation as to Color Perception and Color Relation of Tints.**

Color choice.

A. — See A, **Choice of Color,** pages 28, 29.

Color relationship.

B. — See D, **Colors laid according to their Relationship,** page 31, and C and D, **Color Relationship between Two and Three Colors,** pages 39, 40.

Color recognition.

C. — See E, **Perception of Individual Color,** page 33.

Ideal unit.

D. — See E, **Ideal Color Unit,** page 40.

Color names.

E. — See C, **Knowledge of Color Names,** page 42.

Warm colors.

F. — Talk with the children about the warmth of the sunlight and the warmth of the fire. Ask them to select the colors that make them think of the sunshine and of the fire. They will doubtless select the

colors from red to yellow. Tell the children that because these colors look like the warm and kindly sunshine and like the fire that brightens and glows and gives us heat, they are called **warm colors.** Warm colors.

G. — Colored paper Assortment B contains three tones of each of the six leading colors for scaling, and two tints each of red, orange, and yellow for cutting. Distribute the packages to the children, let them remove all the color material from the envelope and lay it out carefully. Talk with them about the care of the material. Show them how to put the 4×8 pieces back into the envelope, out of harm's way. Let them handle the remaining paper carefully, placing the pieces as they like. Watch them and observe what they do. See how many group the normal with the tints, or do anything that approaches scaling. Keep a record of this result. See B, **Record,** page 30. When the children are through with their arrangements, show them how to return the pieces to the envelopes without injury. Relation of tones.

SECTION II. — Development of Relation of Tones — Scaling — Making in One Tint.

"Each matchless morning marches from the east,
In tints inimitable, divine."

A. — Ask the children to spread their colored papers on the gray board and pick out the six brightest (normal) tones, arranging them in six sepa- Recognition of tone.

Recognition of tone.

rate places on the desk. Next ask them to look carefully at what is left to see if they can find any resemblance or relation between the normal tone and the others. Ask them to place all those that seem to belong together because they resemble each other, in groups, and tell you how many different pieces resembling each other they have in each group. Watch to see how many arrange the pieces in scales of red, orange, and yellow.

Color names. Tints.

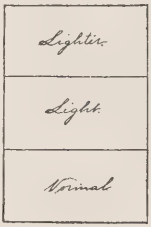
B. — For this exercise each child should have 1 × 2 pieces of paper in the three tones of each of the six leading colors. The teacher should be provided with a sheet of each of the six leading colors and their two tints.

Let the children spread out their pieces on the gray board, and group them as in the preceding exercise. Look over the work to see how many have correct groups. Do not attempt to correct any groups at this time, but pass to the next part of the lesson, keeping in mind what is to be gained beyond what has already been done.

In this exercise, as well as in those that follow, the teacher should use the terms **normal, tones, tints,** freely, taking care that they are never used except in such a way as to bring the *thing* and the *name* directly together. No attempt should be made to teach the children these terms, but it will be found that if the teachers use these terms carefully, the children will soon understand them and use them intelligently.

Color names. Tints.

Ask the children to find among their papers red, and show the piece that is the brightest and reddest red they have. Let them compare their pieces with the teacher's sheet of normal red. Ask them to find another piece of paper that is red, show it, and put it with the brightest red; ask them to find another, show it, and put it with the other reds. Ask if they can find another; probably the most of the children will see that there are but three pieces of red paper among their papers. Then ask them to tell you how the pieces last found differ from the brightest red. They may tell you the other colors are lighter. Ask them to arrange their colors in a group, placing those adjoining each other that most resemble each other. Ask them whether the other two are both equally lighter than the red, and have them tell you that one is light and the other lighter. Ask them then to name the group, — Red, Light Red, and Lighter Red. The children will see that one of these colors is the reddest red — normal red; the other two being lighter, they will be called tints of red. Have them now place the tints as in the accompanying illustration.



Let the children find name, and place the three tones, normal, light, and lighter, of orange, yellow, green, blue, and violet in the same manner. It would be a pleasure to them, no doubt, to see the colors

Color names. Tints.

placed in a neat row across the desk, in the order of color given. Lead them to see that as the colors grow lighter and lighter, they tend more and more toward white.

Individual color. Red. Tints of red.

C. — Review G, **Study of Individual Color, Red,** pages 50, 51, and lead the children to study light red and lighter red in the same way. Hold up the two tints, and ask the children to name some objects that resemble them in color. They may speak of roses, carnations, hollyhocks, and other flowers, as well as the autumn leaves, as having the tones of red.

> "Bright yellow, red and orange,
> The leaves come down in hosts."

Pasting scale of red.

D. — Distribute sheets of manila paper, and let the children place them with long edges from back to front. Have the children arrange the 1 × 2 inch papers of the three tones of red, long edges from left to right adjoining each other as in the illustration on the preceding page, and so that they will occupy the centre of the space they are to fill. Have them paste the lighter red first, then the light red, and last the normal red.

Making. Exercises in one tone.

E. — The exercises to be made from the colored papers are those which are being sequentially developed in the form study. They are quatrefoils, rosettes, stars, crosses, and trefoils. See Plates 4 and 6. If the figure is too difficult to cut free-hand, the pattern should be made by drawing it on manila paper

EXAMPLES OF WORK IN COLORED PAPER.

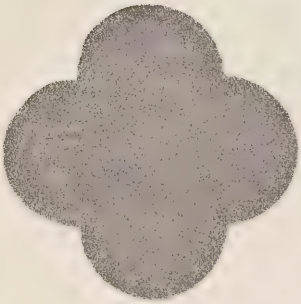


FIG. 20.

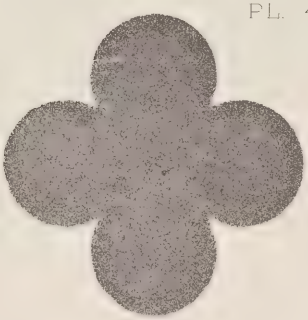


FIG. 21.



FIG. 22.



FIG. 23.

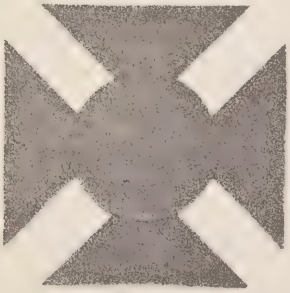


FIG. 24.

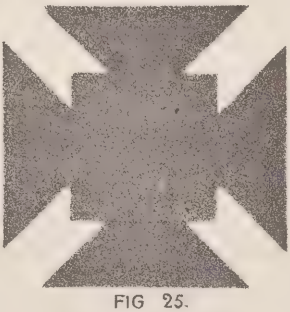


FIG 25.

and cutting on the outline; or, by folding and cutting it, from the manila paper. (For further direction, see manual on folding and cutting.[1]) When the children have made the pattern, let them lay it on the back of the colored paper — draw around it and cut it out. The result may be mounted on manila paper. For pasting, see General Suggestions, pages *22*, *23*.

Making. Exercises in one tone.

F. — It will be well to precede this lesson with a talk about figures used to beautify or ornament buildings, walls, etc., and to let the children use the tablets in laying the quatrefoil, — Plate 1, Fig. 20 — four semicircles around a square. Have the children cut a quatrefoil in each of the tints of red, and, considering carefully the placing so that the whole sheet may look well, mount the two quatrefoils on the same sheet of paper in order to compare them with each other. Ask the children which they like best.

Quatrefoil in tints of red, or border.

A border may be made if preferred.

G. — Review E, **Study of Individual Color, Orange,** pages 48, 49, and lead the children to study the tints of orange in the same way that they studied the normal tone. Ask the children to tell you where they see objects resembling either of the tints of orange in color. Nasturtiums will give every tone of orange.

Individual color. Orange. Tints of orange.

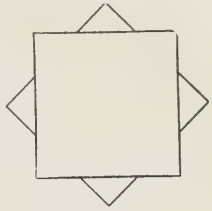
"The orange-tinted sassafras
With quaintest foliage strews the grass."

[1] "Paper Folding and Cutting." A series of foldings and cuttings especially adapted to kindergartens and public schools. By Katherine M. Ball. The Prang Educational Company.

Pasting the scale of orange.

H. — Have the children arrange and paste the scale of orange of the 1 × 2 inch papers, as suggested in D, **Pasting Scale of Red,** page 72.

Eight-pointed star in tints of orange, or border.



I. — Have the children make the eight-pointed star by laying a square on its diameter, overlapping symmetrically a square on its diagonals. See E, **Making, Exercises in One Tone,** page 72. In the event that there is not enough colored paper to have the squares overlap, the pattern may be made by folding and cutting as suggested. Let the children make the star in both the tints of orange and mount them on the same sheet of paper for comparison, in order to find which tint is generally preferred by the children.

A border may be made if preferred.

Individual color. Yellow. Tints of yellow.

J. — Review C, **Study of Individual Color, Yellow,** pages 44–48, and lead the children to study tints of yellow in the same manner. Very delicate color is sometimes found in yellow roses, pansies, also on the wings of butterflies, as well as in the plumage of birds. The afterglow of the sunset gives us all the tones of this color.

"The yellow poplar leaves came down
And like a carpet lay."

Pasting scale of yellow.

K. — Have the children arrange and paste the scale of yellow of the 1 × 2 inch paper, as suggested in D, **Pasting Scale of Red,** page 72.

Rosettes of right-angled triangles, in tints of yellow, or border.

L. — For making the rosette, see B, **Making Border and Rosettes from Colored Paper,** page 60. Have the children make rosettes of each tint of yellow, using the right-angled triangle as a repeat, and either a square or circle for its centre, as suggested in the illustrations, see Plate 4, Figs. 24 and 25. In this exercise it is desirable to have the units and centre of the rosette made in the same tone.

A border may be made if preferred.

M. — Let the children make a border or rosette from the paper remaining, using the colors as they please. The results will doubtless be crude in many cases, but creative activity will receive an impetus. Any good results should be displayed. The others should be preserved, as an aid in the study of the color perception of the children.



CHAPTER IV.

SECOND YEAR — SECOND HALF.

Colors to be Studied.

Green, Blue, Violet, and two tints of each.

MATERIALS. — *For the Teacher:* A sheet of colored paper, at least 4 inches square, of each of the six leading colors and their two tints.

For the Children: Box of color tablets (Assortment B). Gray cardboard upon which to lay tablets. Colored papers (Assortment BB). Manila or gray paper for mounting.

SECTION I. — Review Color Perception.

Color choice.

A. — See A, **Choice of Color,** pages 28, 29.

Color relationship.

B. — See D, **Colors laid according to their Relationship,** page 31, and C and D, **Color Relationship between Two and Three Colors,** pages 39, 40.

Color recognition.

C. — See E, **Perception of Individual Color,** page 33.

Ideal unit.

D. — See E, **Ideal Color Unit,** page 40.

Color names.

E. — See C, **Knowledge of Color Names,** page 42.

Cool colors.

F. — Review F, **Warm Colors,** page 76. Let the children arrange the color unit, and then move the warm colors off toward the left. Lead them from the thought of the warm colors to the thought of the **cool colors.** An interesting story might be told of a

walk in the sun, the refreshing shade of the trees, the cool blue lake, and the violet shadows. Cool colors.

G. — Refer to E, **Ideal Color Unit,** page 40, and to A, **Recognition of Tone,** and B, **Color Names, Tints,** page 70. Aim to have the children see that there is a closer resemblance between the normal tone of a color and its tints, than between two adjoining colors in the color unit. The tint is the same color as the normal tone, but its intensity is reduced, whereas in the case of two adjoining colors, they both have equal intensity — but the hue is changed by the addition of another color, as red and red orange. They both have red in common, but red orange has an additional color, orange, which changes the hue. The exercise should be such as to lead the children to a *feeling* for color. Color relation as to tone, compared with color relation as to hue.

"Red flaming up to yellow,
Yellow passing into green."

The children have the six leading colors and two tints of each in pieces 1 × 2. Let them arrange scales of each from light to dark, as shown in the illustration, arranging the scales in the order of the color unit, red, orange, yellow, etc.

SECTION II. — **Development of Color Relation — Scaling — Making in Two Tints.**

A. — Review G, **Relation of Tones,** page 69; A, **Recognition of Tone,** page 69; and B, **Color Names, Tints,** page 70. Review scaling in tone.

Scaling according to hue and tone.

B. — Have the children make the ideal color unit with the tablets arranged horizontally and in a circle, using normal tones, and lead them to see the progression from one color to another. This is called **Scaling according to Hue.** They should see the progression from the normals to the tints, and from the tints to the normals (this is called **Scaling according to Tone**), as well as from one color to another, as in the ideal unit.

Scaling according to hue, — normals, light tone, lighter tone.

C. — Have the children arrange from the 1 × 2 inch papers, three scales of the six leading colors according to hue, in the order of the color unit, one in normal tones, getting the ideal color unit in six colors, another in light tone, and the third in lighter tone, each scale being placed on a separate sheet of paper.

Individual color. Green. Tints of green.

D. — Review O, **Study of Individual Color, Green,** page 56, refer to C, **Study of Individual Color, Yellow,** pages 44–48, and lead the children to study tints of green in the same manner.

"And light green creeps the tender grass, thick spreading far and near."

Nature is full of greens; possibly the best example of the tints of the true green may be found in the transparency of falling water.

"Yet the broken sunbeams glance between,
And tip the leaves with lighter green,
With brighter tints the flower."

EXAMPLES OF WORK IN COLORED PAPER.

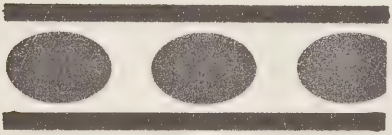


FIG. 26.

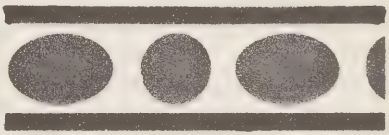


FIG. 27.

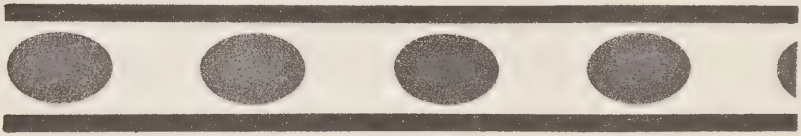


FIG. 28.



FIG. 29.



FIG. 30.



FIG. 31.



FIG. 32.

Pasting scale of green.

E. — Have the children arrange and paste the scale of green, of the 1 × 2 inch paper, as suggested in D, **Pasting Scale of Red,** page 72.

Making, — cutting, pasting, and mounting.

F. — Thus far the exercises have been made of but one tone, mounted on manila or gray paper. The next step is to study and make combinations of two tones, making the units and marginal strips, in borders, from one tone and the background from another. In rosettes the units and centre may be made of one tone and the background of the other. The background should generally be of the lighter tone, the unit of the darker tone.

In making a border, the paper that is to act as the background may be cut from one tone ($2\frac{1}{2}$ inches by 8 inches is a good size), then the strips may be cut from the other, making them about a quarter of an inch wide. They may be placed on the background just at each edge or a little way from each long edge, and the intervening space studied with a view of determining the size of the repeating units to be used for the design. The repeats may be made as suggested in B, **Making Borders and Rosettes from Colored Paper,** page 60.

In making a rosette, the size and shape of the enclosing figure should be considered first, and then the size and shape of the units and centre. The units should never reach to the edge of the background or enclosing figure, and the centre should not be too large nor too small.

Border or rosette. Two tints of green.

G. — Inasmuch as the ellipse is the next exercise in the form study, it will be taken as a repeat for the next border. See Plate 5, Figs. 26, 27, 28. The two tints of green are provided for this lesson; let the children use these tints according to their own taste.

Or, if preferred, have the children make rosettes, using the two tints of green. Either tone may be used for the design or background, according to the child's taste. The quatrefoil on the circle will be a good exercise, as it now claims attention in the form study. For making, see F, **Making, Cutting, Pasting, and Mounting,** page 79.

Individual color. Blue. Tints of blue.

H. — Review M, **Study of Individual Color, Blue,** page 54, and lead the children to study tints of blue in the same manner. A clear sky will give a fine illustration of a scale of blue. If the children do not see the gradation of color, or the difference of tone, between the blue of the zenith and that near the horizon, it may be made clear by cutting three circular holes about three inches in diameter and three inches apart in a piece of paper, and holding it vertically so that the blue of the sky may be seen through the holes. In this way three distinct tones of the color may be seen.

"How light blue the hill, and lighter still the sky."

Pasting scale of blue.

I. — Have the children arrange and paste the scale of blue, of the 1 × 2 inch papers, as suggested in D, **Pasting Scale of Red,** page 72.

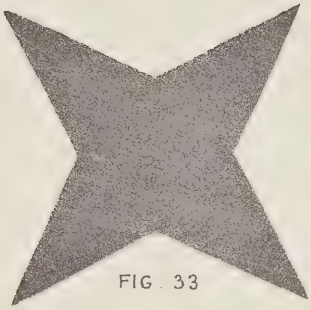


FIG. 33

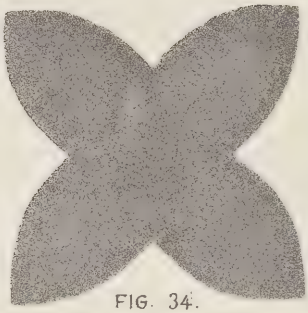


FIG. 34.

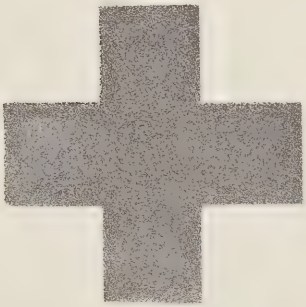


FIG. 35.



FIG. 36.



FIG. 37.

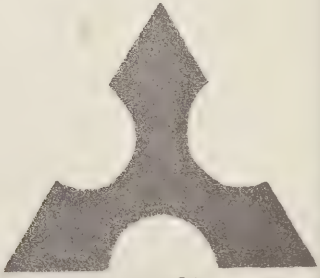


FIG. 38.



FIG. 39.

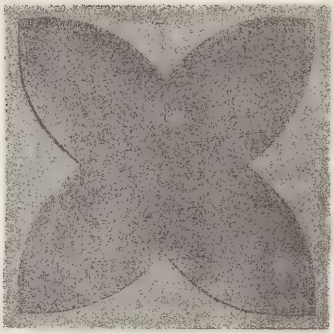


FIG. 40.

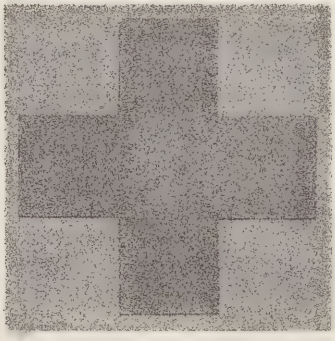


FIG. 41.

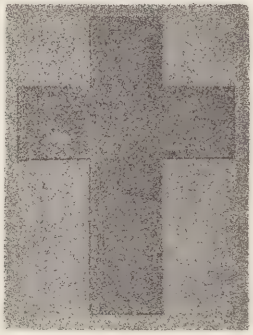


FIG. 42.

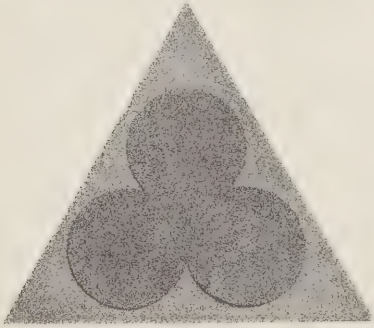


FIG. 43

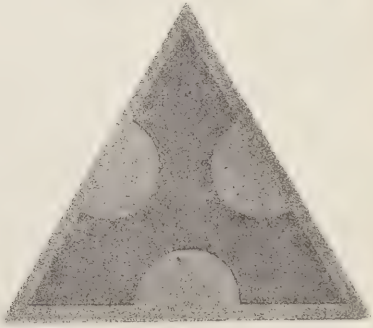


FIG. 44.

Border. Two tints of blue.

J. — The Greek cross occurs here in the form study; it makes a good repeat, so it is suggested for this exercise. See Plates 6 and 7, Figs. 35 and 41. The two tints of blue should be used, or, if preferred, a modification of the four-pointed star will be a good exercise. See Plates 6 and 7, Figs. 33 and 39. For making, see General Suggestions, pages 21–23.

Individual color. Violet. Tints of violet.

K. — Review I, **Study of Individual Color, Violet,** page 51, and lead the children to study tints of violet in the same manner. The flower from which this color receives its name is a good example of a tint of violet. Pansies also furnish good examples of these tints.

> "Under the green hedges after the snow,
> There do the dear little violets grow
> Hiding their modest beautiful heads
> Under the hawthorn in soft mossy beds."

Pasting scale of violet.

L. — Have the children arrange and paste the scale of violet, of the 1 × 2 inch papers, as suggested in D, **Pasting Scale of Red,** page 72.

Border or rosette. Two tints of violet.

M. — For this exercise the isosceles triangle, a figure suggested by the form study, is selected. The two tints of violet are provided in the assortment. Let the children make their own arrangement. See Plate 11, Fig. 64, for suggestions. The illustration shows three tones, but the arrangement in this grade calls for but two tones. For making, see F, **Making, Cutting, Pasting, and Mounting,** page 79.

Border or rosette. Two tints of violet.

The unit consisting of the equilateral triangle and semi-circle combined, also repeats into a very good rosette. See Plate 11, Fig. 62.

N. — A choice from Plate 8, Figs. 18 and 19, may be made from two tones of any color remaining in the envelope. This will encourage a study of color for selection.

O. — A choice of any figure, Plates 1–8 or 10, may be made from one or two tones of any color or colors remaining in the envelope. It is expected that many crude combinations will be made, but doubtless there will result some that are good, and the freedom and choice of the child will be developed. Where liberty of choice is given there will always be thoughtful consideration. The tints of these colors will be more pleasing in combination than the normal tones.



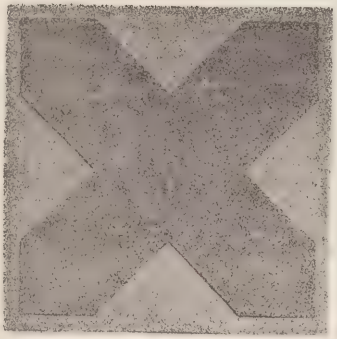


FIG. 45.

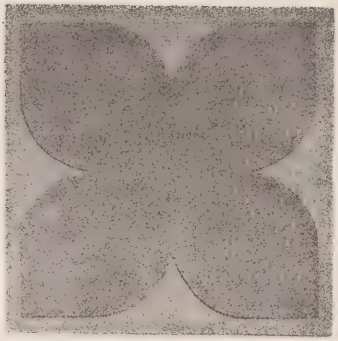


FIG. 46.

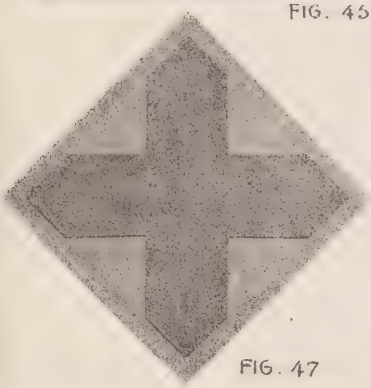


FIG. 47

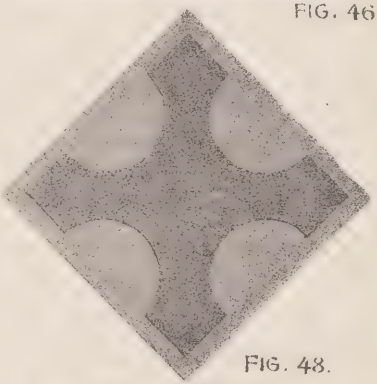


FIG. 48.

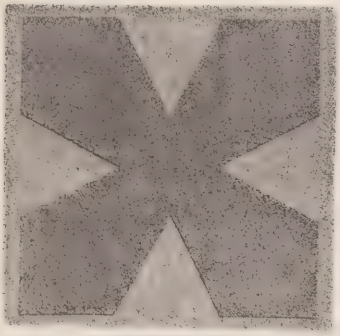


FIG. 49.

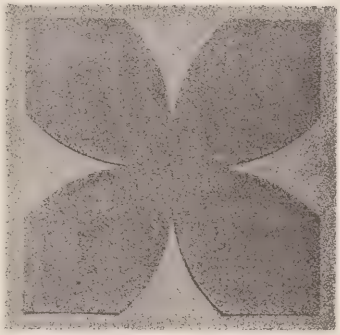


FIG. 50.

CHAPTER V.

THIRD YEAR — FIRST HALF.

Book I.

Colors to be Studied.

Three intermediate colors: Red Violet, Red Orange, Yellow Orange, with two tints of each.

Colored Papers.

Assortment C.

Section I. — Investigation as to Perception of Color and of Color Relation.

A. — Study carefully Chapter I. and carry out the exercises given for investigation, as to Choice of Color, Perception of the Relationship of Color, Knowledge of Color Names, and Perception of Individual Color. Color Perception.

Use color tablets borrowed from the primary grades.

Section II. — Ideal Color Unit.

A. — Have the children arrange the $\frac{1}{2} \times 1\frac{1}{2}$ inch papers according to hue in the order of the ideal color unit (see B, **Scaling to Hue and Tone,** page 77), and paste this color unit on a sheet of manila paper. Ideal color unit.

Section III. — Study of Individual Color — Relation of Tones — Scaling — Making.

Pure color.

How fast she drops the blazing leaves in mirth,
Hark! how she laughs to see them heap the earth,
To see the happy children gather them,
As though each color were a precious gem.

In all this work lead the children as far as possible to observe beautiful color in nature and beautiful color in art. Remember, however, to adapt the illustrations in art to their comprehension. It is well understood that in science and literature subjects must be chosen adapted to the mind of the child; but it is sometimes forgotten that in art, as well, subjects must be chosen adapted not only to the mind, but also to the eye of the child. The color sense is, in a measure, rudimentary at first, and cannot, in its undeveloped state, perceive all the beauties of color, which cultivation reveals. The power of seeing color has to be attained through repeated exercise of the color sense, and the wise direction of such exercise is of great importance. A careful study of the color perception of children shows that it is quite possible to give them colors to study which may be as meaningless to them as the words of definitions which in some times past they were called upon to repeat.

The pure colors of the ideal color unit appeal the most strongly to the child; they are not only the colors which his physical eye perceives most readily, but they are the nearest to him spiritually.

Pure color.

In the desire to escape glaring combinations of color there has been a decided inclination toward dulled colors — so-called "æsthetic colors," as if all the higher beauty lay in these colors. This is misleading; for it is only through the study of pure color that the joy, and the beauty, and the fulness, and the richness, and the glory of color can be reached.

> "The warmth of living color, deep and bright,
> To sweetly satisfy the hungry sight."

Ruskin on order of color.

Ruskin, in preparing "The Laws of Fésole," gave most careful thought to the order of presenting colors. He speaks of this in a footnote, a part of which is quoted below. This quotation is worthy of most thoughtful study by every teacher. It will be remembered that Turner painted largely in pure color.

"One great cause of the delay which has taken place in the publication of this book has been my doubt of the proper time and degree in which study in subdued color should be undertaken. For though on the one hand the entirely barbarous glare of modern colored illustrations would induce me to order practice in subdued color, merely for antidote to it, on the other, the affectation, or morbid reality, of delight in subdued color are among the fatalest errors of semi-artists. The attacks on Turner in his greatest time were grounded in real feeling, on the part of his adversaries, of the solemnity in the subdued tones of the schools of classic landscape.

"To a certain extent, therefore, the manner of study in color required of any student must be left to the discretion of the master, who alone can determine what qualities of color the pupil is

Pure color.

least sensible to, and set before him examples of brightness, if he has become affectedly grave, and of subdued harmony if he errs by crudeness and discord. But the general law must be to practice first in pure color."

Indoor study.

For indoor study lead the children to the observation and enjoyment of color in fruits, and flowers, and in the autumn leaves. Have also some good examples of work in colored paper to show to the children, that they may have some help toward forming ideals.

Outdoor study.

Lead them also to outdoor study of color. Try to discover some accessible place where they may go to see the sunset; go with them if possible and lead them to talk of the beautiful color.

"Till all the crimson changed, and past
Into deep orange o'er the sea."

There should also now be made some mention of gray, and perhaps brown, that the children may have a name to apply to the neutral colors. It is probable that children of this age do not, as a general thing, perceive grays and browns with any great degree of discrimination, for their color sense is not sufficiently developed. Therefore no particular attention should be given to gray, other than using it as a general name.

A little poem is given below from Robert Louis Stevenson's "A Child's Garden of Verses," showing pleasing thoughts of color in the mind of a happy

child. This book is one of the most charming contributions to child literature that has ever been made. Bright and dull color.

"Pleasant summer over
And all the summer flowers.
The red fire blazes,
The gray smoke towers.

"Sing a song of seasons!
Something bright in all!
Flowers in the summer,
Fires in the fall!"

Such an example as this would give opportunity to lead the children to think of **bright** colors and **dull** colors, and to seek for bright and for dull colors. Thus gradually their eyes will be opened to perceive the grays with discrimination and with enjoyment.

A. — Lead the children to study the individual color, red violet, as suggested in Red violet.

C, **Study of Individual Color, Yellow,** pages 44–48;
E, **Study of Individual Color, Orange,** pages 48, 49;
G, **Study of Individual Color, Red,** page 50;
I, **Study of Individual Color, Violet,** pages 52, 53;
M, **Study of Individual Color, Blue,** pages 55, 56; and
O, **Study of Individual Color, Green,** pages 56, 57.

Treat the study of tints in the same manner, trying to lead the thought of the children out to the beautiful color around. Red violet will be found in the leaves of foliage plants, in the leaves of the purple beech, in the luscious plums, in dahlias, in chrysanthe-

Red violet.

mums, and in wild asters. Red violet is akin to the famous Tyrian purple of the ancient Greeks. The purple of the present day leans more to violet. In pansies there will be found all modifications of violet from blue violet through violet and purple to red violet.

Red violet is also akin to crimson, which is red violet approaching red. Have the pupils arrange the scale of red violet, and lead them to a delight in the beautiful transition from the normal to the lighter tint —

"upward to the light."

The children will feel the symbolism.

Red orange.

B. — Lead the children to study the individual color red orange and its tints, and have them arrange the scale of red orange.

The various scarlet flowers, like the scarlet geranium, show this color.

"The scarlet poppies stand erect and tall,
Color that burns as if no frost could tame."

Here would come in also the bright berries, — the wintergreen, the partridge berry.

"And scarlet berries tell where bloomed the sweet wild rose."

Yellow orange.

C. — Lead the children to study the individual color, yellow orange and its tints, and have them arrange the scale of yellow orange.

"See, how in the fragrant fruit
The orange to yellow pales."

D. — Have the children paste the scales of red violet, red orange, and yellow orange, of the 1 × 2 inch papers, on a sheet of manila paper, arranging the tints at the upper and the normal at the lower part of the scale, as in the illustration, page 71. The three scales should occupy equal parts of the sheet, making the arrangement orderly. Pasting scales of tints.

E. — Have the children cut and paste a circle of normal red violet for page 7 of the Drawing-Book. The children may cut the circle free-hand; or they may draw on the back of the sheet of colored paper, and in one corner, a square having the diameter of the required circle, cut out the square and round off the corners, thus cutting the circle free-hand; or they may draw the circle free-hand on the back of the paper in one corner and cut the circle to line. Circle. Red violet.

F. — Let the children cut and fold a square of normal red orange paper as suggested in the Manual text for page 15 of the Drawing-Book. The square should be of the size given for the upper right corner of the page and should be pasted there. Square. Red orange.

G. — Have the children make a border of normal yellow orange for page 17 of the Drawing-Book. Border. Yellow orange.

Let the children cut free-hand from each long edge of the sheet of normal yellow orange paper, a strip about three-eighths of an inch in width. Let the children place these strips on the place for the border on page 17, and then let them estimate the width of the strip necessary to make the repeats. The strip

Border. Yellow orange.

for the repeats may then be cut and six squares be cut from it. The border may be made of square repeats, or free-hand circles to be used as repeats may be cut from the squares. The border may then be pasted.

Quatrefoil. Red orange.

H. — Have the children make the quatrefoil within a square for page 19 of the Drawing-Book of two tones of red violet, normal and light, and paste it on the illustration, Fig. 1. The quatrefoil should be smaller than the square. The quatrefoil should be first mounted on the square and then the whole be pasted over Fig. 1 of page 19.

Greek cross. Red orange.

I. — Have the children make the Greek cross for page 23 of the Drawing-Book of light red orange, and paste in the space indicated for it.

Border.

J. — Let the children choose a border for page 24 of the Drawing-Book and the color with which to make it. The choice of borders may be from Plate 10. One or two tones of red violet, red orange, or yellow orange may be used.

Choice.

K. — Give the children opportunity to make arrangements of the colored paper remaining. Make the work as joyous as possible, and let the children in this exercise work according to their sweet will.

"yea, delight
We have, the colors are so bright."



FIG. 51.

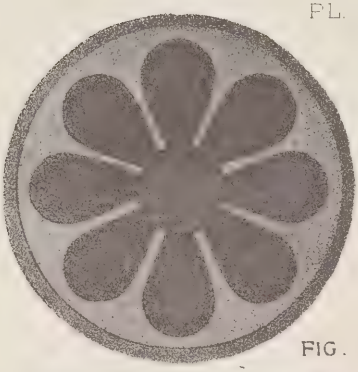


FIG. 52

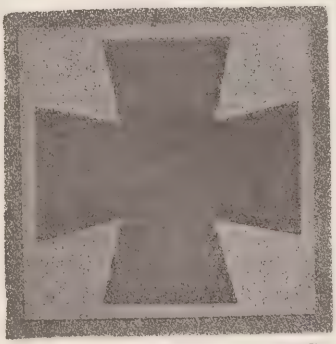


FIG. 53.

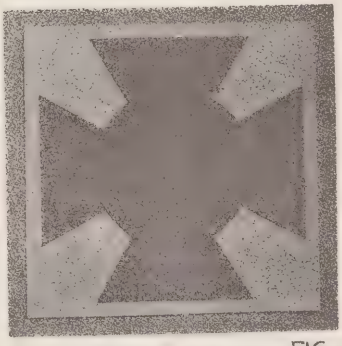


FIG. 54.

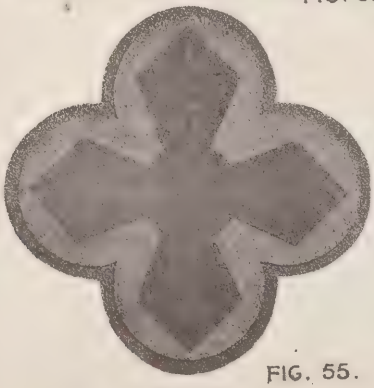


FIG. 55.



FIG. 56.

EXAMPLES OF WORK IN COLORED PAPER.

PL. 10.

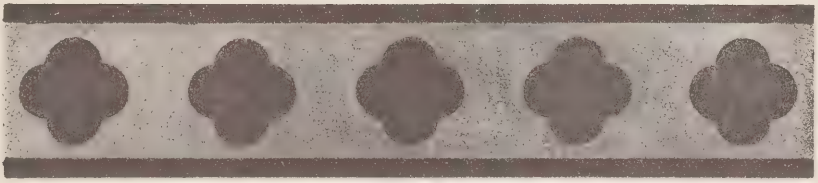


FIG. 57.

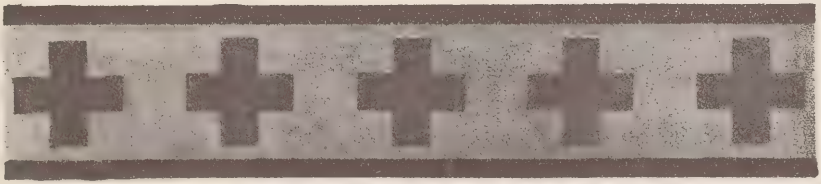


FIG. 58.



FIG. 59.

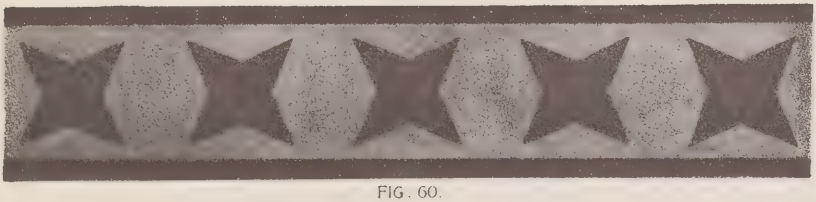


FIG. 60.

CHAPTER VI.

THIRD YEAR — SECOND HALF.

Book II.

Colors to be Studied.

Three intermediate colors: Yellow Green, Blue Green, Blue Violet, with two tints of each.

Colored Papers.

Assortment CC.

Section I. — Review — Color Perception.

Color perception.

A. — Study carefully Chapter I. and carry out the exercises given for investigation as to Choice of Color, Perception of the Relationship of Color, Knowledge of Color Names, and Perception of Individual Color.

Use color tablets borrowed from the primary grades.

Section II. — Study of Individual Color — Relation of Tones — Scaling — Making.

Color observation.

In the study of this series of colors lead the children to the observation and enjoyment of color, not only in fruit and flowers, but also to outdoor study

Outdoor study.

of the trees and the landscape; the yellow green of the fields in the sunlight, the blue green of the distant woods, the blue violet of the hills far away show beautiful transition through the intermediate colors.

Yellow green.

A. — Lead the children to study the individual color yellow green and its tints. See

C, **Study of Individual Color, Yellow,** pages 44–48;
E, **Study of Individual Color, Orange,** pages 48, 49;
G, **Study of Individual Color, Red,** page 50;
I, **Study of Individual Color, Violet,** pages 52, 53;
M, **Study of Individual Color, Blue,** pages 55, 56;
O, **Study of Individual Color, Green,** pages 56, 57; and
B, **Color Names, Tints,** page 70.

During this study and that of the two intermediates following, the color unit tablets should be on the desk arranged in the order of the color unit. This will keep the whole, the ideal, before the children and also serve as a standard to which they may refer. After having arranged the color unit tablets, each of the intermediates may be slipped forward half way, so that they may be seen readily, and at the same time the progression of the ideal color unit will be kept.

Yellow green will be found in fruits, — bananas and apples and pears.

> "Pass the apples, please, again,
> Russet, greening, snow and pippin."

Yellow green.

And this beautiful green comes with the early spring flowers.

"Daffodils merry and bright
Nestle in their yellow green cups."

Blue green.

B. — Lead the children to study blue green and its tints, keeping the whole color unit before them. Let them give to these some outdoor study if they can. They may see

"blue green firs listening to the maple leaves,"

or from some hill they may discover that

"Below the blue green river windeth slowly."

Blue violet.

C. — Lead the children to study blue violet and its tints. Ask them to think of anything they have ever seen that is blue violet.

"Some yellow plums I've brought
And damsons too — blue violet."

Perhaps some will remember how blue the violets are sometimes — a real blue violet. And possibly there may be one who will have noticed the distant hills.

Pasting scale according to hue.

D. — Let the children arrange the color unit tablets in the order of the ideal color unit. Have the children arrange the $\frac{1}{2} \times 1\frac{1}{2}$ inch papers according to hue in the order of the color unit, studying the colors carefully and referring to the tablets in any case of doubt, and paste this arrangement of the lighter tint on a sheet of manila paper.

"Like phantom rainbows seen in dreams."

Scaling.

E. — Have the children arrange and paste scales of the 1 × 2 inch papers, of yellow green, blue green, and blue violet, on a sheet of manila paper, arranging the tints at the upper and the normal at the lower part of the scale.

The three scales should occupy equal parts of the page, making the arrangement orderly.

Oblong. Yellow green.

F. — Have the children cut an oblong of yellow green, and paste it on page 7 of the Drawing-Book, making it the size of the oblong given.

Quatrefoil. Blue green.

G. — Have the children make the design in the quatrefoil for page 17 of the Drawing-Book, of two tones of blue green, and of the same size as the illustration, Fig. 5. Let them paste it on Fig. 5, and make a drawing of it in Fig. 6.

Shield. Blue green.

H. — Have the children make a shield the size of Fig. 2, page 23, of the Drawing-Book, of two tones of blue green, and paste it on the illustration.

For this purpose let them draw a shield of the required size, freehand, on manila paper, cut it out, and use it as a pattern. They may place it on the back of the light blue green paper, mark around it, and then cut the shield. They may cut the band of normal blue green, finish the shield, and mount it on Fig. 2.

Border.

I. — Have the children make a border for page 24 of the Drawing-Book. They may make it of one tone of yellow green, two tones of blue green, or three tones of blue violet, using the dog-tooth orna-

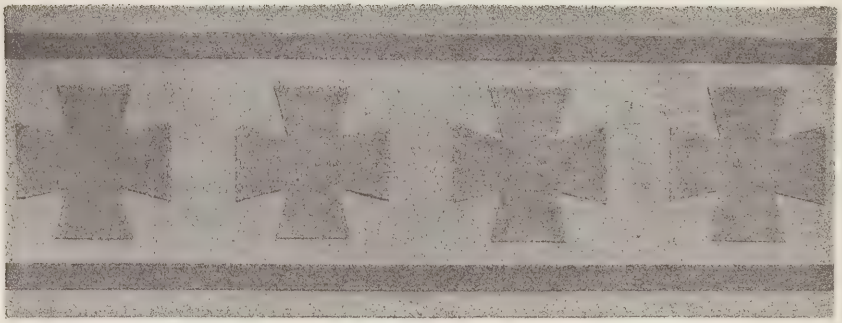


FIG. 61.



FIG. 62.



FIG. 63.

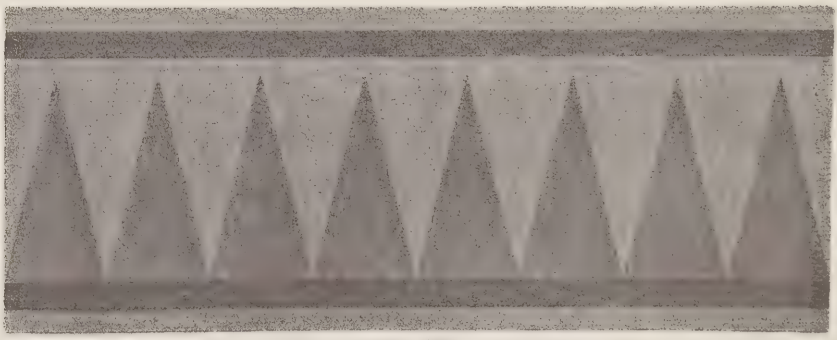


FIG. 64.

ment on page 18 as a repeat. Let them mount it on page 24. Border.

If one tone is used, the arrangement will be similar to those on Plate 1; if two tones are used, the arrangement may be similar to those on Plate 10; if three tones are used, the arrangement may be similar to those on Plate 11. If two or three tones are used, the background may be made about $2\frac{1}{2}$ inches wide by 8 inches long. In using three tones, it is desirable to avoid any arrangement of the tones like scaling, as this gives a perspective effect undesirable in decoration.

J. — Allow the children to make a border or figure from the colored paper remaining. It is very desirable that there should be opportunity for free choice in color work, that the children may feel entirely at liberty to exercise their creative activity. Choice.

"To let the new life in, we know
Desire must ope the portal."



CHAPTER VII.

FOURTH YEAR — FIRST HALF.

Book III.

Colors to be Studied.

The six leading colors: Red, Orange, Yellow, Green, Blue, Violet, and two tints and two shades of each.

Colored Papers.

Assortment D.

Section I. — Review — Color Perception.

Color Perception.

A. — Study carefully Chapter I., and carry out the exercises given for investigation, as to Choice of Color, Perception of the Relationship of Color, Knowledge of Color Names, and Perception of Individual Color.

Use color tablets borrowed from the primary grades.

Broken colors.

B. — It is now time to introduce the study of **broken colors,** — the result of breaking the hue of a unit-color with gray or black. The shades of color, as well as the different grays, are broken colors. As the eye of the child perceives positive color more readily than broken colors, it is thought best to take

the shades of color before the grays; for there is more positive color in the shades of the unit colors than in the grays. Using the $1 \times 1\frac{1}{2}$ scaling pieces of colored paper, investigate as to the perception of the relationship of tone, regarding shades as well as tints, following the method of A, **Recognition of Tone,** page 69. Shades.

As the shades of color darken they lead toward black.

Section II. — Study of Individual Color — Relation of Tones — Scaling — Making.

In connection with the sequential study of this half-year it will be pleasant to lead the pupils to the study of the color of birds, when possible, as well as of flowers and of the landscape.

A. — Review the study of red and its tints. Lead the pupils to study the shades of red. Red.

> "A rose, how darkly red!"
>
> "Where poppies, dusky red,
> Nod sleepily beside the golden wall."

Let them arrange the scale of five tones. Remember that this work will lead the pupils to appreciate the beauty and harmony of color.

B. — Review the study of orange and its tints. Orange.

Lead the pupils to study the shades of orange and to arrange the scale of five tones. The shades of

Orange.

orange and yellow may at first present some difficulty. It must be remembered, however, that the shades of a color do not deepen it, but that they darken it toward black.

TO AN ORIOLE.

How falls it, oriole, thou hast cause to fly
In typic splendor through our Northern sky?

At some glad moment was it Nature's choice
To dower a scrap of sunset with a voice?

Or did some orange tulip, flaked with black,
In some forgotten garden, ages back,

Yearning towards Heaven until its wish was heard,
Desire unspeakably to be a bird?

— EDGAR FAWCETT.

Yellow.

C. — Review the study of yellow and its tints.

"Yellow bird, where did you learn that song,
Perched on the trellis where grapevines clamber,
In and out, fluttering all day long,
With your golden breast bedropped with amber?"

— CELIA THAXTER.

Lead the pupils to study the shades of yellow and to arrange the scale of five tones.

Green.

D. — Review the study of green and its tints.

"A trembling undergush of faintest green
As daily sunbursts strike adown the hills."

Lead the pupils to study the shades of green.

"Behind the mowers, on the amber air, Green.
A dark-green beechwood rises, still and fair,
A white path winding up it like a stair!"

Let them arrange the scale of five tones.

E. — Review the study of blue and its tints. Blue.

"The first time that Mabel went,
Nothing at all saw she,
Except a bird, a sky-blue bird
That sate upon a tree."

— MARY HOWITT.

Speak of azure as one of the names of blue.

"Light-yellow leaves with spots and stains
Of violet and of crimson dye
Or tender azure of a sky
Just washed by April rains."

— HENRY W. LONGFELLOW.

Lead the pupils to study the shades of blue.

"Darkly, deeply, beautifully blue,
As some one somewhere sings about the sky."

Let them arrange the scale of five tones.

F. — Review the study of violet and its tints. Violet.

Ask the pupils to look for violet in the clouds.

"Then rich cloud masses dyed the violet's hue
With orange sunbeams dropping swiftly through."

Lead the pupils to study the shades of violet and arrange the scale of five tones.

G. — Have the pupils scale the 1 × 2 inch papers according to hue (see B, **Scaling to Hue and Tone,** page 77), first using the N's (normals), making a scale Scaling according to hue.

Scaling according to hue.

in which the intermediates are missing; then arranging the L's (light tones), and then the L L's (lighter tones), giving scales in tints. Have scales according to hue arranged from the shades in the same way.

Scaling according to tone.

H. — Have the pupils paste from the 1 × 2 inch papers the scales of the five tones of red, orange, and yellow on a sheet of manila paper, and the scales of green, blue, and violet on another sheet of manila paper, arranging the tints at the upper and the shades at the lower part of the scale.

Rosette. Dark red.

I. — Have the pupils make a rosette for page 13, of the Drawing-Book of D (dark) red. Inasmuch as the rosette is five inches in diameter and the paper only four inches wide, it will be necessary to piece it, which is not objectionable. Half may be cut at a time.

The pupils may draw and cut the pattern for the rosette from manila paper, and then trace and cut the figure from the colored paper as in previous exercises. Lead the pupils to realize that beauty of effect can be attained only by careful work.

Quatrefoil. Tones of orange.

J. — Have the pupils make the oblong quatrefoil for page 16 of the Drawing-Book, using L L (lighter), L (light), and D (dark) tones of orange. Let them think of the effect of the various tones for the various parts of the figure. A good effect may be produced by cutting an oblong quatrefoil of the full size of Fig. 1 from the dark tone of orange, then an oblong quatrefoil three-eighths of an inch smaller all around

from the L L (lighter) orange paper, then the units and central figure from the L (light) orange paper. In cutting the units and centre, the space values must be thoughtfully studied. Quatrefoil. Tones of orange.

K. — Have the pupils make the border given in Fig. 2, page 17, using D (dark) and D D (darker) tones of yellow. The dark yellow is made quite brilliant by its use with the darker yellow, and thus represents very well the gold used so much in Moorish art. Border. Tones of yellow.

Let the pupils cut a strip free-hand $2\frac{1}{2}$ inches by 8 inches from the sheet of D (dark) yellow paper. Let them cut free-hand two marginal strips one-quarter of an inch in width from the sheet of D D (darker) yellow paper. Let them cut the units by a pattern from the D D yellow paper. Let them mount it on page 24.

L. — Let the pupils cut and make figures according to their own choice from the paper remaining. Lead them to express their own ideas of beauty in the use of color. Such effort will develop their sense of beauty in color and figure and their power to produce the beautiful. Choice.

Robin says: "A scarlet waistcoat
Will be all the wear,
Snug, and also cheerful-looking
For the frostiest air;
Comfortable for the chest, too,
When one comes to plume and pair."

Spoke the Swan, entrenched behind
An inimitable neck:
"After all, there's nothing sweeter
For the lawn or lake
Than simple white, if fine and flaky
And absolutely free from speck."

"Yellow," hinted a Canary,
"Warmer, not less distingué."
"Peach-color," put in a Lory,
"Cannot look outré."
"All the colors are in fashion
And are right," the Parrots say.

"Very well; but do contrast
Tints harmonious,"
Piped a Blackbird, justly proud
Of bill aurigerous,
"Half the world may learn a lesson
As to that from us."

—CHRISTINA G. ROSSETTI.



CHAPTER VIII.

FOURTH YEAR — SECOND HALF.

Book IV.

Colors to be Studied.

The six leading colors, Red, Orange, Yellow, Green, Blue, Violet. and two tints and two shades of each.

Colored Papers.

Assortment DD.

Section I. — Review — Color Perception.

Color perception.

A. — Study carefully Chapter I. and carry out the exercises given for investigation as to Choice of Color, Perception of the Relationship of Color, Knowledge of Color Names, and Perception of Individual Color.

Use color tablets borrowed from the primary grades.

Color relation.

B. — Investigate as to the perception of the relationship of tone, regarding shades as well as tints, following the method of A, **Recognition of Tone,** page 69.

Colors of morning.

SECTION II. — Review of Individual Color — Relation of Tones — Scaling — Making.

"Far along I saw them sail,
Wafted by an upper gale;
Saw them on their lustrous route,
Fling a thousand banners out:
Yellow, violet, crimson, blue,
Orange, gray-green, — every hue
That the gates of heaven put on."

"The white, blue, purple, gold, scarlet, and ruby of morning clouds are meant to be entirely delightful to the human creatures whom the clouds and light sustain. Be sure you are always ready to see *them* the moment they are painted by God for you.

"But you must not rest in these. It is possible to love them intensely, and yet to have no understanding of the modesty or tenderness of color.

"Therefore, next to the crystalline firmament over you, the crystalline earth beneath your feet is to be your standard."

— *Laws of Fésole*, JOHN RUSKIN.

Synonyms of color.

It will add interest to the work if pupils are given some of the synonyms of color as they study the different colors. These synonyms are largely taken from the names of gems which show brilliant transparent color, and also show marvellously rich shades of color. The poet loves to use these names, — ruby for red, amber for yellow, emerald for green, sapphire for blue, and amethyst for violet. To him, also, white is often silver, and yellow and orange are gold. Perhaps the pupils can find some examples of the use of these expressive names. Here is a verse from Tennyson.

Synonyms of color.

"A million emeralds break from the ruby-budded lime
In the little grove where I sit — ah, wherefore cannot I be
Like things of the season gay, like the bountiful season bland,
When the far-off sail is blown by the breeze of a softer clime,
Half lost in the liquid azure bloom of a crescent of sea,
The silent sapphire-spangled marriage ring of the land."

Quality of color.

It would seem well to give attention throughout this work to the quality of color. At this time it would seem particularly appropriate to introduce some knowledge of transparent color, which transmits the rays of light, and opaque color, which transmits no rays of light.

Lead the pupils also to observe the beauty of **transparent** color through color washes and by the use of colored glass. Lead them to find color that is not *transparent* and give the term **opaque.**

Red.

A. — Review the study of the five tones of red, and speak of the ruby.

"Rubies, with Pearls! That's Nature's jewelry!"

Orange.

B. — Review the study of the five tones of orange. As there are different hues in gold itself, so all the hues from orange to yellow are called golden.

"Where the golden orange glows in the deep thicket's gloom."

Yellow.

C. — Review the study of the five tones of yellow. Speak of amber as a favorite name, descriptive of yellow tones. Amber varies very much in tone.

"The amber, clear and golden,
Wept from great trees."

Yellow. See how the yellow becomes golden with the poet.

GOLDEN GLORIES.

The buttercup is like a golden cup,
 The marigold is like a golden frill,
The daisy with a golden eye looks up,
 And golden spreads the flag beside the rill
 And gay and golden nods the daffodil.
The gorsey common swells a golden sea,
 The cowslip hangs a head of golden tips,
And golden drips the honey which the bee
 Sucks from sweet hearts of flowers and stores and sips.

— CHRISTINA G. ROSSETTI.

Green. **D.** — Review the study of the five tones of green.

"A livelier emerald twinkles in the grass."

Speak of the emerald and its beautiful lights and shades.

Emeralds! The color, Fanny! of the light
 Sifted through lime-leaves on a summer noon,
Or curl of crested wave, when foam-bells bright
 Fringe the green furrows of the sea in June.

Such should true emeralds be; green — it is said —
 As throat of parroquet; or spark quick-twinkled
From firefly's lamp; or fresh unfolded blade
 Of water-grass; or lotus-leaf unwrinkled,

New-risen 'mid the pool; or glow which fringes
 The gleaming amethysts in the peacock's train.
Sourindro Mohun holds "all Virtue hinges
 On tints like these."

— EDWIN ARNOLD.

E. — Review the study of the five tones of blue. Tell of the soft and deep blue of the sapphire. **Blue.**

"A purer sapphire melts into the sea."

F. — Review the study of the five tones of violet. **Violet.**

"In tints of violet and ruby blooms."

The amethyst in its gentle lustre shows all the tones of violet.

It should be colored as though violet satin
Changed to translucent crystal — with clear glow
Of rose-red 'gainst the Sun: — the learnëd Latin
"Eyelid of Venus" styles it, tinted so.

— EDWIN ARNOLD.

G. — Have the pupils arrange scales of the $\frac{1}{2} \times 1\frac{1}{2}$ inch papers according to hue (see B, **Scaling to Hue and Tone,** page 78) as suggested in C, **Scaling according to Hue,** page 78, using only the tones of the leading colors. When the scales are complete, have the children find from the assortment of paper the L (light) tones of the six intermediate colors, and insert them in their relative position in the L scale. **Scaling according to hue.**

Paste this scale on a manila sheet.

H. — Have the pupils make a Moresque ornament for page 15 of the Drawing-Book, of D (dark) blue. **Ornament.**

The artists' triad of **primary**[1] colors is yellow, red, and blue. From the mixture of these they obtain the

[1] It must be noted that scientists do not agree as to the primary colors in *light*. This disagreement does not, however, disturb the artists' theory of primary *pigment* colors.

Ornament.

secondaries, orange, green, and violet. The Moors used the artists' triad, red, yellow (gold), and blue in their principal wall decorations, leaving the secondaries, orange, green, and violet, to be used mainly on dados and floor mosaics.

Figures having the character of the one given in this exercise are usually in red, yellow (in most cases represented by gold), or blue.

Let the pupils draw the pattern free-hand, cut it out, apply the pattern to the figure in the Drawing-Book and correct it if necessary before using it as a pattern on the colored paper. Let them mount it in the space at the right of the illustration.

In this exercise the color work takes the place of the drawing. The appreciation of beautiful proportion and curvature is sometimes attained better through color than by drawing the outline only.

Rosette. Violet.

I. — Have the pupils make the rosette for page 16, using N (normal), L (light), and L L (lighter) tones of violet. In arranging the tones for the rosette avoid the appearance of scaling, as this produces an unstable effect. For the general plan of making the rosettes, see J, **Quatrefoil,** page 100.

Border. Green.

J. — Have the pupils make a border of N (normal), L (light), and D (dark) tones of green. For the general plan of making a border from three tones see K, **Border,** page 101.

The rosette on page 16, arranged as in Fig. 3, page 17, will make a good border.

K. — Give the pupils opportunity to make rosettes, borders, or figures from the papers remaining. Lead them to see that very striking contrasts of tone and color are not as desirable as more moderate contrasts, and that this is as true in dress and other ornament as in colored paper. Choice.



CHAPTER IX.

FIFTH YEAR — FIRST HALF.

Book V.

Colors to be Studied.

The six intermediate colors, Red Violet, Red Orange, Yellow Orange, Yellow Green, Blue Green, Blue Violet, with two tints and two shades of each.

Colored Papers.

Assortment E.

Section I. — Review — Color Perception.

Color perception.

A. — Study carefully Chapter I. and carry out the exercises given for investigation as to Choice of Color, Perception of the Relationship of Color, Knowledge of Color Names, and Perception of Individual Color. Remember that the starting point for the further cultivation of the color sense must be a knowledge of the present state of color perception in the pupils.

Use color tablets borrowed from the primary grades.

Color relation.

B. — Using the 1 × 2 inch papers, investigate as to the Perception of the Relationship of Tone, regarding shades as well as tints, following the method of A, **Recognition of Tone,** page 69.

SECTION II. — **Review of Individual Color — Relation of Tones — Scaling — Making.**

A. — While the study of color according to their hues and combinations is advancing sequentially, it is intended that there shall be also continuous study of the quality of color. It would seem especially fitting that iridescence should be taken up at the same time that intermediates and their different tones are studied, for the intermediates play a stronger part in iridescence than the leading colors. Iridescence.

In the study for the first year the rainbow was spoken of as the pathway down which Iris, the messenger of the gods, a maiden in beautiful raiment, came from heaven to earth. Iris stands now for the rainbow; from her name comes the word iridescent, describing that color effect which shows many colors blending into each other and changing with the light. The opal glows and pales in rainbow hues and the pearl of shells reflect them.

I pray you gaze awhile on these lit stones
By fancy fetched from Australasian steeps,
Where moony pearl sets blazing scarlet tones,
And pale gold melts to green, and amber leaps

To bloomy violets; and celestial blues
Flicker to rose and ruby. You shall turn
Nowise these jewels, but their shifting hues
To some new brilliancy will swiftly burn.

— EDWIN ARNOLD.

Iridescence.

The plumage of birds shows wonderful iridescence, usually in darker tones. Glass becomes iridescent after a long burial; many examples will be found in collections of Etruscan articles.

> On some far beach long rosy surges, breaking,
> Bear sails of gold
> Which dip and fly, their airy streamers shaking
> Fold after fold.
> Not Golgos' nor Idalium's buried beaker,
> Irised by time,
> Displays such hues as tint with magic liquor
> Yon cup sublime.
>
> —*An August Sunrise*, THOMAS GOLD APPLETON.

Iridescent glass, in which play all the colors of the rainbow, is now manufactured.

It may be well in the study of color for this half-year to give such special attention to the plumage[1] of birds as may be possible, and to bring before the pupils that beautiful play of colors where "with mystery, through mystery, the one glows and flushes through the other, like cloud seen through cloud."

Red violet.

Review the study of red violet and its tints. Lead the pupils to study the shades of red violet and to arrange the scale of five tones. In studying the tones of color, use the methods of studying individual colors, given in Chapter I.

[1] Any who are interested in the cause of iridescence in plumage will be glad to read what Ruskin says in "The Laws of Fésole," chapter vii.; this chapter is entitled, "Of Elementary Organic Structure."

Red violet.

Do not let these color exercises degenerate into mere routine. Endeavor to lead the thought of the pupils to a knowledge and appreciation of the beautiful color about them. The tones of red violet are beautifully shown on the breast of the dove.

"With a rush and a whir of shining wings,
They hear and obey — the dainty things!
Dun and purple, and snowy white,
Clouded gray, like the soft twilight."

Red orange.

B. — Review the study of red orange and its tints. Lead the pupils to study the shades of red orange and to arrange the scale of five tones.

"There flits the scarlet tanager."

Yellow orange.

C. — Review the study of yellow orange and its tints. Lead the pupils to study the shades of yellow orange and to arrange the scale of five tones.

"And gorgeous pheasants with their golden glow
Like Iris just bedabbled in her bow."

Yellow green.

D. — Review the study of yellow green and its tints. Lead the pupils to study the shades of yellow green and to arrange the scale of five tones.

"I quit the search, and sat me down
Beside the brook, irresolute,
And watched a little bird in suit,
Of sombre olive, soft and brown,
Perched in the ample branches mute;

Yellow green.

With greenish gold its vest was fringed,
Its tiny cap was ebon-tinged,
With ivory pale its wings were barred,
And its dark eyes were tender-starred.
"Dear bird," I said, "what is thy name?"
And thrice the mournful answer came,
So faint and far, and yet so near, —
"Pe-wee! Pe-wee! peer!"

— J. T. TROWBRIDGE.

Blue green.

E. — Review the study of blue green and its tints. Lead the pupils to study the shades of blue green and to arrange the scale of five tones.

The humming-bird is a flashing bit of blue green.

"And then from the shapes' vague sheen
Quick lustres of blue will float,
That melt in luminous green
Round a glimmer of ruby throat."

— EDGAR FAWCETT.

The blue green of the peacock will occur to every one.

"Meridian sunbeams tempt him to unfold
His radiant glories, azure, green and gold."

Blue violet.

F. — Review the study of blue violet and its tints. Lead the pupils to study the shades of blue violet and to arrange the scale of five tones. Most beautiful tones of blue violet will be found in damascened iron or steel.

Scaling according to hue.

G. — Have the pupils arrange the scales according to hue (see B, **Scaling to Hue and Tone,** page 78), *i.e.*,

arrange the different colors of the same tone progressively as in the ideal color unit, from the 1 × 2 inch papers, making five scales, one of the normal, one of each of the tints, and one of each of the shades. During the arrangement of these scales keep before the pupils as much as possible the ideal color unit made from the tablets, or as seen in the color chart No. 1, that they may see the unit as a whole.

Scaling according to hue.

H. — Have the pupils paste the scales of red violet, red orange, and yellow orange on a sheet of drawing paper, and the scales of yellow green, blue green, and blue violet on another sheet, arranging the tints at the upper and the shades at the lower part of the scale.

Scaling according to tone.

I. — Have the pupils make the *fleur-de-lis* ornament for page 15 of the Drawing-Book of D (dark) red violet, according to the directions for I, **Ornament,** page 108.

Fleur-de-lis. Red violet.

The *fleur-de-lis* was the royal emblem of France.

> "The glad deep lilies that burn in our sight,
> The great live lilies for standard and crown."

J. — Have the pupils make a rosette for page 18, of N (normal), L (light), D (dark), tones of yellow orange, according to the suggestions for I, **Rosette,** and J, **Quatrefoil,** page 100. For the combination of tones see Plates 11 and 12. Inasmuch as the paper is only four inches wide, and it is desirable to make

Rosette. Yellow Orange.

Rosette. Yellow orange. Border. Red orange.

the rosette five inches in diameter, it will be necessary to do some piecing.

K. — Have the pupils make a border for page 24 of the Drawing-Book, of N (normal), L (light), and D (dark) tones of red orange. For suggestions for making see K, **Border,** page 101. For combinations of tones see Plates 11 and 12. The illustrations of page 19 of the Drawing-Book suggest a pattern.

Choice.

L. — Give all possible opportunity for individual choice in making figures or borders from the colored paper remaining.

The catkins of alder and of willow (pussy-willow) show wonderful color. The study of birds will have given some beautiful ideas of color.

> "Hark! now he is tapping the old hollow tree,
> One step farther on: now look upward — that's he!
> Oh, the exquisite bird! with his downward hung head,
> With his richly-dyed greens, his pale yellow and red!
> On the gnarled trunk-tree, with its sober-toned gray,
> What a beautiful mingling of colors are they!"
>
> — MARY HOWITT.



CHAPTER X.

FIFTH YEAR — SECOND HALF.

Book VI.

Colors to be Studied.

The six intermediate colors, Red Violet, Red Orange, Yellow Orange, Yellow Green, Blue Green, Blue Violet, with two tints and two shades of each.

Colored Papers.

Assortment EE.

Section I. — Review — Color Perception.

Color perception.

A. — Study carefully Chapter I. and investigate as to Choice of Color, Perception of the Relationship of Color, Knowledge of Color Names, and Perception of Individual Color, endeavoring to ascertain the state of color perception in the pupils in order to carry out succeeding work intelligently.

Use color tablets borrowed from the primary grades.

B. — Using the pieces $\frac{1}{2}$ by $1\frac{1}{2}$ inches, investigate also as in A, **Recognition of Tone,** page 69.

SECTION II. — **Review of Individual Color — Relation of Tones — Scaling — Making.**

Iridescence.

A. — The quality of iridescence is finely shown in insects, that are like "winged flowers or flying gems." They exemplify also the effect of small bits of brilliant color. Caterpillars, butterflies, and moths are especially good examples of the harmony possible among positive colors when they are used in small quantities and with mediating color.

A gentle word or two, like those of the verse quoted below, will do much to turn the attention of the pupils pleasantly and lovingly toward the beautiful insect world.

"Little thoughtful creatures sit
On the grassy coasts of it,
Little things with lovely eyes
See me sailing with surprise.
Some are clad in armor green —
(These have sure to battle been);
Some are pied with every hue,
Black and crimson, gold and blue;
Some have wings and swift are gone,
But they all look kindly on."

— ROBERT LOUIS STEVENSON.

Red violet.

Review the study of the five tones of red violet.

"As are the Tiger Moth's deep damask wings."

Among the moths, "birds of the night," will be found wonderful tones of red violet.

B. — Review the study of the five tones of red orange. Look for the spots of scarlet (red orange) on the wings of butterflies. Red orange.

"That pass like meteors through the shady bowers
And rest like broken rainbows on the flowers."

C. — Review the study of the five tones of yellow orange. Butterflies in their brilliant coloring give particularly good examples of the orange series of color, which ranges from red to yellow in the ideal color unit. Yellow orange.

"A golden butterfly, upon whose wings
There must be surely character'd strange things."

D. — Review the study of the five tones of yellow green. Iridescence, especially in the darker hues and tones, is especially well exemplified in the marvellous sheen of beetles and flies. Yellow green.

"I love, too, when the children lie,
Deep in the clovery grass,
To watch among the twining roots
The gold-green Beetle pass." [1]

E. — Review the study of the five tones of blue green. It is hoped that pupils may have opportunity to discover these colors in insects. Blue green.

"Here and there they dart
And flash like gleams of green and azure light."

[1] Mary Howitt's little book, "Birds and Flowers," though published fifty years ago, still speaks brightly.

Blue violet.

F. — Review the study of the five tones of blue violet.

> "The little Gnat in beauties may compare
> With all his rival brothers of the air:
> Transparent wings, blue violet, green and gold,
> Bright eyes, small feet and gay fringed tail behold."

Scaling according to hue.

G. — Have the pupils arrange scales from the $\frac{1}{2} \times 1\frac{1}{2}$ inch papers according to hue, as suggested in C, **Scaling according to Hue,** page 78, using only the intermediate colors. When the scales are complete, have the children find from the assortment of paper the D (dark) tones of the six leading colors and insert them in their relative positions in the D scale. This scale may be pasted on a sheet of drawing paper. The darker scale may also be pasted.

Fleur-de-lis. Yellow green.

I. — Have the pupils make the *fleur-de-lis* for page 16 of the Drawing-Book of D (dark) yellow green and paste it on the illustration, or in the vacant space beside it. For suggestions for making see I, **Ornament,** page 108.

The *fleur-de-lis* has been used in ornament for centuries; it appears in all colors. But it is now considered as distinctive of Gothic architecture. In the Gothic style yellow green frequently occurs.

Many would derive this ornament from the flower that bears its name, fleur-de-lis or flower-de-luce. In this connection the verses given below, from Longfellow's poem, "Flower-de-luce," will be read with pleasure.

Fleur-de-lis. Yellow green.

"The burnished dragon-fly is thine attendant
And tilts against the field,
And down the listed sunbeam rides resplendent
With steel-blue mail and shield.

"Thou art the Iris, fair among the fairest,
Who, armed with goldenrod,
And winged with celestial azure, bearest
The message of some God."

Border. Blue green.

J. — Have the pupils make a border for page 19 of the Drawing-Book of L L (lighter), N (normal), and D (dark) tones of blue green. For suggestions for making see K, **Border,** page 101. For combinations of tones see Plates 11 and 12.

Rosette. Blue violet.

K. — Have the pupils make a rosette for page 24 of the Drawing-Book of N (normal), L (light), and D (dark) tones of blue violet. For suggestions for making see I, **Rosette,** and J, **Quatrefoil,** page 100. For combination of tones, see Plates 11 and 12. Inasmuch as the paper is only four inches wide and it is desirable to make the rosette five inches in diameter, it will be necessary to do some piecing, which is not objectionable.

Choice.

L. — A certain amount of work is definitely stated, so that the colors studied may be impressed by use. After the required work is done, give the pupils liberty of choice in color in making some decorative figures from the paper remaining.

CHAPTER XI.

SIXTH YEAR.

BOOKS VII. AND VIII.

Colors to be Studied.

Seven grays: Red Gray, Orange Gray, Yellow Gray, Green Gray, Blue Gray, Violet Gray, Neutral Gray, with two tints and two shades of each.

Papers.

Assortments F and FF.

SECTION I. — Review — Color Perception.

Color perception.

It will aid the teacher much in succeeding work to study carefully Chapter I., and to make the investigations there suggested as to the state of color perception in the pupils. These investigations will serve as a basis for subsequent work.

Use color tablets borrowed from the primary grades.

SECTION II. — Study of Individual Color — Relation of Tones — Scaling — Making.

Order of study.

The outline, pages 16–18, suggests the study, first, of pure color, then of broken colors, to be taken as follows: —

1. The six leading colors of the color unit, with their tints. Order of study.
2. The six intermediates of the color unit, with their tints.
3. Broken colors, as seen in the shades of the colors of the color unit.
4. Broken colors, as seen in the grays, their tints and shades; the grays may be made by the mixture of the three colors of the artists' triad.

The mingling of such colors in outdoor effects is beautifully given by the poet.

"The misty blue — the distant masses,
The air, in woven purple glimmering,
The shiver transiently that passes
Over the leaves as though each tree
Gave one brief sigh — the slumberous shimmering
Of the red light — invested seem
With some sweet charm, that soft, serene,
Mellows the gold — the blue — the green
Into mild-tempered harmony."

— ALFRED B. STREET.

The grays are now taken up in regular sequence. Seven grays — red gray or russet, orange gray or brown, yellow gray or citrine, green gray or olive, blue gray or slate, violet gray or heliotrope, and neutral gray — are given; it will be seen that these include the three colors which are known as tertiaries. The grays

The work for the sixth and seventh years is laid out on the basis of the sixth year, as given in the out-

The grays.

line, pages 17, 18, as but few schools have had sufficient preliminary study of color to be ready to carry out with good color perception the work of the seventh year as there laid down.

The first half of the year.

As the work is new, the upper classes will have had no opportunity to study the grays; it would therefore seem well in the first half of the year to give only the red, orange, and yellow grays. Autumn and early winter give this range of colors in the rustling leaves and in the fields.

> "And the very color's tone
> Russet now and fervid grown."

Here is an October picture:

> "While arrayed in its robes of russet and scarlet and yellow,
> Bright with the sheen of the dew, each glittering tree of the forest
> Flashed like the plane-tree the Persian adorned with mantles and jewels."
>
> —HENRY W. LONGFELLOW.

Advancing and retiring colors.

Lead the pupils in their study of color this year to observe advancing and retiring colors, and let them experiment to see which colors seem to be more noticeable and which least so. A study of insects[1] and their colors, which make some of them almost imperceptible, will be interesting.

[1] Teachers will find a great deal that is helpful in this direction in "The Colors of Animals." By Edward Bagnall Poulton. The International Scientific Series. D. Appleton & Co.

Lead the pupils to study red gray or russet, also its tints and shades, as suggested in the study of the various individual colors and of tints and shades, in Chapters I., III.–X. The winter tones of russet are fine.

Red gray or russet.

"Aerial webs invisible, that link
Sere russet fern with glooms of yellow grass,
And green fir-needles are palpable star-chains
Of fairy jewels."

— RODEN NOËL.

And red gray is in the tender colors of spring. Have the pupils arrange the scale of red gray, in five tones, from the 1 × 3 inch papers.

"The crimson, and the russet, and the gold,
The palest green that gives a hint of spring,
And nameless colors that swift breezes fling
From waving trees."

— MAURICE EGAN.

Lead the pupils to study orange gray or brown, also its tints and shades.

Orange gray or brown.

"The dead leaves their rich mosaics
Of olive and gold and brown,
Had lain on the rain-wet pavements
Through all the embowered town."

— SAMUEL LONGFELLOW.

The browns in the various nuts and seed-vessels are very rich. Charming collections of these may be made for the school-room; they will serve as delightful examples for study in both color and form. And

Orange gray or brown.

the brown comes also in the spring. Have the pupils arrange the scale of orange gray.

"And from the alder's crown
Swing the long catkins brown."

Yellow gray or citrine.

Lead the pupils to study yellow gray or citrine, also its tints and shades. Have the pupils arrange the scale. The name seems to have been chosen from the yellow gray of the citron.

"And the luscious fruit in citrine gleams."

Scales according to tone.

Have the pupils paste the scales of red gray, orange gray, and yellow gray on a sheet of drawing paper, arranging the tints at the upper and the shades at the lower part of the scale.

The second half.

In the second half of the year, the four remaining grays may be taken. The twilight skies are full of these grays.

Remember that the purpose is to lead the pupils to a greater power of color perception, hence to a greater enjoyment of the beauty of color. Do not let the work become mechanical. Study Chapter I., Section IV., pages 43–57, for the general spirit of the work.

Green gray or olive.

Lead the pupils to study green gray or olive, its tints and shades. Have the pupils arrange the scale.

"Between thin fingers of the pine
The fluid gold of sunlight slips,
And through the tamarack's green-gray fringe
Upon the level birch leaves drips."

—Samuel Weir Mitchell.

Green gray or olive is not the same as the color known as olive green in textiles. Olive is beautifully described by Celia Thaxter. Green gray or olive.

"And exquisite, pale, sharp-leaved olives grew
In moonlight colors, silver green and gray."

Lead the pupils to study blue gray or slate, its tints and shades. Have the pupils arrange the scale. Blue gray or slate.

"And till the star of evening climbs
The blue gray east, a world too soon."

Lead the pupils to study violet gray or heliotrope, its tints and shades. Have the pupils arrange the scale. Violet gray or heliotrope.

"And flowers, no colder lover could entrance,
See in his face the fulness of their hope,
And smile to hear men call them heliotrope."

Lead the pupils to study neutral gray, its tints and shades. Have the pupils arrange the scale. Neutral gray.

"The vapors from the ocean had ascended,
Fume after fume, wreath upon wreath, and floor
On floor, till a gray curtain upward spread
From sea to sky, and both as one appeared."

Have the pupils paste scales of green gray, blue gray, violet gray, and neutral gray on a sheet of paper, arranging the tints at the upper and the shades at the lower part of the scale. Scales according to tone.

In general, it is presumed that the work in color in this year will be in the grays, and the regular assort- Work of the year.

Work of the year.

ments to be used with Drawing Books VII. and VIII. include only grays.

Book VII.

For Book VII., a historic unit may be cut in one tone of red gray, a surface covering may be made in three tones of orange gray, and a historic border in two tones of yellow gray.

Book VIII.

For Book VIII., a historic unit or a border in two tones of green gray, and a historic unit in one tone of blue gray. A surface covering may be made in three tones of violet gray.

In arranging designs made in three tones, endeavor to avoid any appearance of scaling, as it gives a perspective effect, not desirable in decoration. Consider carefully also space values (see page 61).

Historic ornament.

At this time a regular study of color in connection with Historic Ornament should be taken up if possible. Examples should be worked out in colored paper, but this can be done successfully only when colored examples are provided. In this year the Egyptian and Greek styles of ornament are taken up. The following statements may prove suggestive to those who can take up some polychromatic ornament in connection with the study of the grays. A study of mummy cases and of Greek vases in art museums will be of great value.

Egyptian ornament.

The Egyptians used color profusely in their temples, their tombs, and on their mummy cases, as well as on pottery and textiles. The palette of the Egyptian artist contained seven depressions in the form of

Egyptian ornament.

royal cartouches, for seven colors, to be arranged in the following order: white, yellow, green, blue, red, dark brown, black. There were two kinds of yellow, — a bright yellow, and the dull yellow of yellow ochre (one authority gives five kinds of yellow); there were three kinds of blue, — an azure blue, a greenish blue, and a dark blue; the reds were made of burnt ochre. The general tone of Egyptian ornament seems to have inclined more to yellow than to any other color. Green was used less than red, yellow, and blue. In connection with these they had the grays except violet gray.

> "Also, that cloistered wall was compassed in
> With pillars wonderful for work and hue;
> This one, a palm stem; that, papyrus, thin;
> Yonder, in stone, lotuses pink and blue."
>
> — EDWIN ARNOLD.

Greek ornament.

It is more difficult to determine with regard to the range and nature of color used by the Greeks than with regard to those of the Egyptians. Much of the coloring of the Greeks is found on fragments of marble that have long been exposed to the weather. The supposition is, however, that the colors used by the Greeks were fewer, more nearly typical, than that of the Egyptians; they used red, blue, green, brown, black, and gold. They used much less green than the Egyptians and a great deal of red and orange gray.

List of Authorities.

List of authorities.

To those who have access to large libraries, the following list of books[1] (by no means exhaustive), giving examples of polychromatic Egyptian and Greek ornament, may be of service.

Jones, Owen: The Grammar of Ornament. 1856.
Der Ornamenten Schatz.
Racinet, A.: Polychromatic Ornament. 1873.
Ware, W. R., and Heinzen, K. F.: Parallel of Historic Ornament. 1875.

Layard, A. H.: The Monuments of Nineveh. 1849, 1853.
Perrot, G., et Chipiez, C.: Histoire de l'Art dans l'Antiquité. 1882, 1884.
Prisse d'Avennes: Histoire de l'Art Egyptien. 1879.

Fenger, L.: Dorische Polychromie. 1880.
Hittorff, J. J.: On Greek Polychromy. 1851.
Penrose, Francis Cranmer: An Investigation of the Principles of Athenian Architecture. 1851.

Choice.

In addition to any arrangements mentioned above, encourage the pupils in the use of the colored paper remaining, making such combinations of color as please them. Talk freely with pupils as to choice of color for dress. Lead them to see that as dress is a form of decoration, the colors chosen for dress should not be glaring.

Collection.

It will interest the pupils very much if they are asked to go to the woods, or to a garden, and make

[1] All the books in this list, with one exception, are published abroad. The "Parallel of Historic Ornament" is published by L. Prang & Co., Boston.

a collection illustrating the red, orange, and yellow grays in their different tones. Collection.

"Come, let us go into the lane, love mine,
And mark and gather what the autumn grows:
The creamy elder mellowed into wine,
The russet hip that was the pink-white rose;
The amber woodbine into rubies turned,
The blackberry that was the bramble born;
Nor let the seeded clematis be spurned,
Nor pearls, that now are corals of the thorn.
Look! what a lovely posy we have made
From the wild garden of the waning year."

— Alfred Austin.



CHAPTER XII.

SEVENTH YEAR.

BOOKS IX. AND X.

Colors to be Studied Provisionally.

Seven Grays: Red Gray, Orange Gray, Yellow Gray, Green Gray, Blue Gray, Violet Gray, Neutral Gray, with two tints and two shades of each.

Papers.

Assortments F and FF provisionally.

SECTION I. — Review — Color Perception.

Color perception.

Base the work on the state of color perception in the class; in order to do this carry out the methods of investigation suggested in Chapter I. Use color tablets borrowed from the primary grades.

SECTION II. — Review of Individual Color — Relation of Tones — Scaling — Making.

Colors.

The colors given for study in the seventh year are the same as those given for the sixth year; but this is merely a provisional arrangement made because in

most places the pupils of this year will not have had the study of grays. Colors.

In the first half of the year review the study of red gray or russet, of orange gray or brown, of yellow gray or citrine, and their tints and shades, and have the pupils arrange the scales of these colors in five tones. Follow the methods of Chapter XIII. Three grays.

Lead the pupils to see that the grays partake to some extent of the nature of the colors of which they are modifications; for example, the red, orange, and yellow grays are warm grays.

Lead the pupils also in their study to consider the desirability of harmony of scale in all the uses of color and also the quiet resulting from the use of colors in one scale.

Have the pupils arrange five scales, L L, L, N, D, and D D, from the $\frac{1}{2} \times 1\frac{1}{2}$ inch papers, according to hue in the order of the color unit, placing the long edges of the papers from left to right, and paste the L L (lighter), N (normal), and D D (darker) scales on one sheet of paper, placing the L L scale at the upper and the D D scale at the lower part of the sheet; and paste the L and D scales on another sheet of paper, placing the L scale at the upper and the D scale at the lower part of the sheet. Scales according to hue.

"What visionary tints the year puts on
When falling leaves falter through the motionless air
Or nimbly cling and shiver to be gone."

—JAMES RUSSELL LOWELL.

Four grays.

In the second half of the year lead the pupils to the study of the five tones of green gray or olive, of blue gray or slate, of violet gray or heliotrope, of neutral gray, and have the pupils arrange the scales. Then let them arrange the normal tones by twos, observing how differently the blue gray looks when placed by the green gray from what it does when placed by the violet gray, — the effect of juxtaposition. Let them try the effect of juxtaposition on the violet gray and on the green gray. Let them arrange the scales again; see how the harmony of scale is lost if into either of the three scales a tone of one of the other grays is introduced. Ask them to observe the prevailing tints of walls and ceilings in various rooms with reference to harmony of scale.

Scale according to hue.

Have the pupils arrange five scales without the neutral gray according to hue, L L, L, N, D, and D D, in the order of the color unit, placing the long edges of the papers from left to right, and paste the L L (lighter), N (normal), and D D (darker) scales on one sheet of paper, placing the L L scale at the upper and the D D scale at the lower part of the sheet, and paste the L and D on another sheet, placing the L scale at the upper part and the D scale at the lower part of the sheet.

Symphony of color.

"Heaven hath its symphonies! What tones combine
To swell the cadenced chords of luminous gray
That change upon the abysmal hyaline,
Whose glimpses sweet throb to the azure play

Of an ethereal melody . . . Symphony of color.
Such unheard harmonies
The deaf ear of Beethoven smote from above
Through vision, — filled with heaven his inky blots."

— JOHN TODHUNTER.

Assortments.

It is assumed that as a general thing the work in color in this year will be in the grays; therefore the assortments used in the sixth year are recommended for the seventh year.

It will be well, if possible, to study the color of the historic ornament covered by Drawing-Books IX. and X., and to work out some examples in colored paper. This cannot be done satisfactorily, however, without the use of colored examples.

In Drawing-Book IX. the Roman, Byzantine, and Romanesque styles are presented. The grays in the assortment may be used according to the figures chosen. Red gray is especially suited to Roman ornament, and yellow gray to Byzantine and Romanesque ornament. A surface covering may be worked out in orange gray.

In Drawing-Book X. the Saracenic and Gothic styles of ornament are presented. The grays in the assortment may be used according to the figures chosen. Green gray is especially good for the Saracenic ornament, and the blue gray can be used with good effect. Violet gray often appears in Gothic ornament. A surface covering may be worked out in green, blue, or violet gray.

Roman ornament.

In the Roman style, as far as can be learned from the ruins of Pompeii and Herculaneum and a few other fragments, red and yellow were great favorites. The red was a brown red that has come to be known as Pompeiian red or Pompeiian brown. Green is also used, and blue, but more sparingly. Violet appears to a considerable extent, but more frequently as violet gray than as violet. The colors themselves seem all slightly subdued, although the effect of juxtaposition often makes them appear very brilliant. The Pompeiians seemed to like large fields of color, unbroken except by a central ornament and a narrow border.

Byzantine and Romanesque ornament.

In the Byzantine and Romanesque styles, brighter, purer colors were used; red, blue, and green prevailed, together with yellow, which was mainly presented by gold. Color was used with great profusion both on the interior and exterior of buildings. Ruskin [1] has given most wonderful word-paintings of the colors of St. Mark's. In closing his description of the front, he says, "the St. Mark's porches are full of doves that nestle among the marble foliage, and mingle the soft iridescence of their living plumes, changing at every motion, with the tints, hardly less lovely, that have stood unchanged for seven hundred years."

Saracenic ornament.

The Alhambra furnishes some of the finest examples of Saracenic ornament, with a definite scheme

[1] "Stones of Venice," Vol. II., pp. 74, 78.

Saracenic ornament.

of color. The colors for the walls are the three primary colors found in the artist's triad, — red, yellow, blue, the yellow being represented by gold; the green, blue, violet, the artist's secondaries, are used on the dados, while the tertiaries or grays are used in borders and the mosaic floors. The scheme of brilliant coloring was carried also into textiles and embroideries.

"Upon their broidered garments of crimson, green, and blue."

The Taj Mahal, which is illustrated in Drawing-Book X., gains its color mainly from translucent marble and from gems.

"But yet a greater wonder! for its sides —
Where the wan stones spread whole — holds inlaid wealth,
Of fair delicious fancies, wreath and sprig,
Brown tulip, and colored rose, lilies and vines,
All done in cunning finished jewellery
Of precious gems — jasper and lazulite,
Sardonyx, onyx, blood-stone, golden-stone,
Carnelian, jade, crystal, and chalcedony,
Turkis and agate; and the berries and fruits
Heightened with coral-points and nacre-lights
(One single spray set here with five-score stones)
So that this place of death is made a bower."

— EDWIN ARNOLD.

Gothic ornament.

Color in the Gothic style of ornament is abundantly represented in the great abbey churches and cathedrals of the world. In this style all the colors of the ideal unit appear. Illuminated missals furnish very beautiful examples.

Gothic ornament.

The colors used in wall decoration are very brilliant, and to these are added the glory of color in stained glass.

> "See, too, the Rose, above the western portals
> Flamboyant with a thousand gorgeous colors
> The perfect flower of Gothic loveliness."
>
> — HENRY W. LONGFELLOW.

Authorities.

The following list of books[1] (not at all exhaustive), giving colored illustrations of historic ornament, may be of service to those having access to fine libraries, who wish to look up the historic styles presented for the seventh year.

Jones, Owen: Grammar of Ornament. 1856.
Racinet, A.: Polychromatic Ornament. 1873.
Ware, Wm., and Heinzen, K.: Parallel of Historic Ornament. 1875.

Mau, August: Geschichte der Decorativen Wandmalerei in Pompeji. 1882.
Presuhn, Emil: Pompeji. 1882.

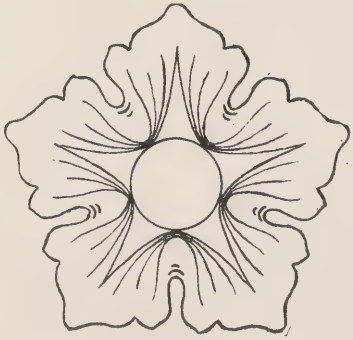
Salzenberg, W.: Old Christian Architectural Monuments of Constantinople, from the Fifth to the Twelfth Century. 1864.
Texier, C. F. M., and Pullan, R. P.: Byzantine Architecture. 1864.
Wyatt, M. D.: Specimens of the Geometrical Mosaic of the Middle Ages. 1848.

[1] All the books in this list, with two exceptions, are published abroad. "Examples of English Mediæval Foliage and Coloured Decoration," by J. K. Colling, was published by J. R. Osgood & Co., Boston. "The Parallel of Historic Ornament," by Professor Ware and K. Heinzen, is published by L. Prang & Co., Boston.

Revoil, Henry: Architecture Romane du Midi de la France. 3 volumes. 1873. **Authorities.**

Goury, J., and Jones, Owen: The Alhambra. 1842–45.
Prisse d'Avennes: La Décoration Arabe. 1885.

Boiserée, S.: Histoire et Description de la Cathédrale de Cologne. 1842–43.
Colling, J. K.: Examples of English Mediæval Foliage and Coloured Decoration, taken from Buildings of the 12th to the 15th Century. 1875.
Gonse, Louis: L'art Gothique. 1890.
Monographie de la Cathédrale de Chartres. 1867.



CHAPTER XIII.

MORE ADVANCED WORK.

Colors to be Studied.

The six leading colors, the six intermediates, the twelve inter-intermediates, the seven grays, with tints and shades of each.

Colored Papers.

Assortments G and GG.

More advanced work.

It is quite possible that pupils of the eighth Grammar year and of the High School may be called on to take this work without having had any serious study of color. The order of study with them should follow the general order that has been given in the previous chapters, and should be carried on in the same spirit. It would be well for teachers taking up the work in the eighth year, and in more advanced classes, to study thoughtfully all of the previous work.

Observation of color.

In order to develop color perception there must be color observation in sequential order. This observation should be twofold; viz., that of the types of color, which are found in the colored papers,[1] and

[1] It is not claimed that the colors in these papers are absolute standards, but that they approach as near to standards as pigments and the present conditions of manufacture will allow.

Observation of color.

that of color around us in nature and in art. The objects of observation in nature and in art that are chosen should be selected not only with relation to their color, but also with relation to their interest for the pupils.

Leading and intermediate colors.

In early stages of development the range of vision seems limited, and individual objects interest more than broad views. Therefore, with the study of the six leading colors and their tints, pupils are led to observe fruit, flowers, and leaves, and the qualities of color, *warm* and *cold*. Intermediates and their tints are taken next, and in the observation of nature outdoor effects are approached, — the sunset first, as it appeals so strongly to the eye by its vivid coloring, then the more quiet colors of the trees and hills and the landscape; in quality, *bright* and *dull* colors are taken up and pupils are introduced to gray and brown as general terms. Good examples of color arrangements are also shown.

Broken colors.

Broken colors next appear; they are first studied in the shades of the leading and of the intermediate colors. The shades are not introduced in the early work because they seem inappropriate to early development, which should tend more to glad, happy, lightsome growth; seriousness and responsibility come later.

Shades of color.

The shades when presented should be studied rather with regard to their richness than to their gloom. Therefore the beautiful colors of birds and insects may accompany the work at this stage.

Color of birds.

Emerson, speaking here of birds, shows through his all-embracing vision, beauty joining beauty, to make a "perfect whole."

> "Bring your music and rhythmic flight,
> Your colors for our eyes' delight."

Synonyms of color.

Pupils may learn something of the synonyms of color that have arisen from the brilliancy and depth of colors in gems. They may also learn of *transparent* and *opaque* colors and of iridescence.

The grays.

Next, those broken colors are taken which are made in pigments by a mixture of the three colors of the artist's triad, red, yellow, blue. Those here given are the seven grays, — red gray, orange gray, yellow gray, green gray, blue gray, violet gray, and neutral gray with their tints and shades. The mind and the eye are now opened to more subtile hues; the more elusive colors of nature and of art now appear. *Advancing* and *retiring* colors are studied; color effects in landscape, in pictures, and in decoration begin to attract the attention. The use of color in historic styles of ornament is presented.

Recognition of color.

Pupils in the eighth year, and more advanced grades, may be led in the same way, in exercises appropriate to their years, from the recognition first of the six leading and the six intermediate colors and their tints, and to their shades and through the grays. The study of quality of *luminous* and *non-luminous* colors may be taken up.

Harmony of color must also be considered. Theory cannot help a great deal at present in the study of combination; the whole work is so new that it must depend for its advancement in this direction on the co-operation of those who are studying the subject in its relation to education.[1] This is almost an untried field.[2] While very good theories may be advanced as to combination of color in the abstract, very little is known as yet as to methods of leading pupils to appreciate and create polychromatic harmony. The next chapter gives some suggestions that it is hoped may be helpful.

Harmony of color.

Some opportunity should be given for the use of colored papers as a means of developing the work. Just what the exercises should be must be determined by the state of color perception in the class. Care should be taken not to give to pupils colors which are quite beyond their power of appreciation.

Colored papers.

The equipment for this work consists of papers, 1 × 3 inches, of each of the six leading colors, the six intermediates, the seven grays, and their tints and shades. These colors should be studied in the groups

[1] Experiments are now being made as to the order of perception of color at Harvard University, at The University of Wisconsin, at The Leland Stanford University, and by The Prang Normal Art Classes.

[2] Chevreul and Beaumont have done much towards the study of combination of color for industry, Bacon and Field and Burnet with reference to artists, Von Bezold and Church with reference to decoration. But the subject has not been approached by any of these writers from the side of the development of the color sense.

Colored papers.

mentioned, according to the methods given in previous chapters.

Harmony of scale should be a strong feature of the study. Combinations of color should be attempted; this is a most important feature of the work. Experiments may be made by the pupils with the pieces in the assortment, and the colored papers desired for the work may then be obtained by pupils.

In connection with this study of combinations of standard colors with the colored papers, the harmony of color combinations in dress may be considered, treating dress, however, not as a vanity, but as a fine art, and as having a moral bearing.

Quality of color.

The quality of color in textiles will prove an interesting study — the soft lights and rich shades in velvet, the brilliancy of satin, the sheen of silk, the fulness and depth and delicacy of color in woollen, with its great possibilities in harmonious combination — all these present new beauties. A fine Oriental rug will furnish many lessons in harmony of color. Nature must be studied too.

"A crust of tiny rubies clings
To this gray boulder on the waste,
Thick set in fairy cups and rings
That wintry frosts have not effaced.

"Exquisite color, rare design,
Inimitable daintiness,
In faultless pattern, 'broidered fine
The gray and ancient rock to dress."

— Anna Boynton Averill.

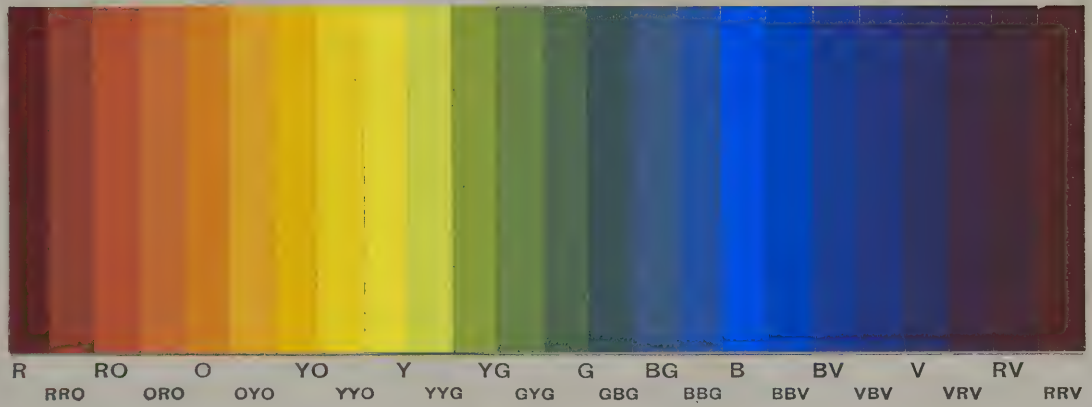
Facsimile in miniature
with addition of Color Names.

No. 2. 24 Colors.

THE PRANG COLOR CHART.

Twenty-four Standard Normal Colors, completing in equal intervals the Ideal Color Unit.

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Boston. New York. Chicago.

By these various studies a feeling for color harmony will grow — a feeling that will lead pupils to a selection of harmonious colors, not on account of a set formula for combination, but on account of the colors themselves. As colors vary in quality and hue with every material, it is impossible to predicate that certain colors will always be harmonious. Feeling for color.

Next may be presented the color unit, illustrated by twenty-four colors, made by the introduction of twelve inter-intermediates, — red red orange, orange red orange, orange yellow orange, yellow yellow orange, yellow yellow green, green yellow green, green blue green, blue blue green, blue blue violet, violet blue violet, violet red violet, red red violet and their tints and shades. A diagram on Plate 13 illustrates this nomenclature. Twenty-four unit colors.

The study of these colors will lead pupils to the appreciation of more subtile and refined differences of color. The impressions made upon the brain by the handling and use of the colored papers of the twenty-four colors will lead, it is believed, to the power of perceiving and appreciating correspondingly those combinations which produce harmony of color. As so many elements enter into the production of harmony of color, a separate chapter is given to their consideration. Color in its highest sense is spiritual. Harmony of color — the reconciliation of diverse elements through mediation — exemplifies the highest harmony of life.

CHAPTER XIV.

STUDY OF COLOR HARMONY.

Color harmony.

THE exercises given in the preceding pages have simply opened the way for the study of color harmony through the cultivation of the color sense by means of color scales of tone and hue, and color contrasts of tone mainly. A few suggestions are added here for the further development of the subject which it is hoped may prove helpful to teachers who are ready for more advanced work.

Color perception.

It must be remembered that color education must depend on the cultivation of the color sense and that theory will not avail; for the presentation of color theory to those who cannot perceive color in its various modifications is useless. *The power of color perception grows through cultivation.* This cannot be repeated too often, for there is a feeling that color is perceived equally well by all except those who are color blind. The growth of the color sense must be gradual, like any other natural growth. Exercises in color should therefore be sequential; the color sense of pupils should be constantly studied so that exercises beyond their power of color perception may not be given.

Study of effects.

The study of the effect of juxtaposition of colors, of color values, of color qualities, of color contrasts, should be taken up, so that harmonious combinations of tones and hues may be made.

Effect of Juxtaposition of Colors.

Change in appearance.

This is a most important study, as colors present a very different appearance when juxtaposed from that which they present when separated. Thus a blue and an orange, which may appear to be rather dull when separated, will appear quite brilliant when juxtaposed. The effect of the juxtaposition of the normal blue and the normal orange is too glaring for a pleasing effect in decoration. Red and green, and purple and yellow, are similarly metamorphosed by juxtaposition.

Exercises in juxtaposition.

Oblongs of the same size may be cut from any three neighboring tones in a monotone scale, as for instance the lighter, light, and normal red. The lighter and light oblongs may be juxtaposed; beside them and at a little distance, another oblong of the light and one of the normal may be juxtaposed. The two light oblongs will appear to be of different tones.

A normal circle of any hue may be pasted on a square of the lighter tone of the same hue; another normal circle may be pasted on a square of the darker tone of the same hue: here the difference in the appearance of the circles will be noted.

Exercises in juxtaposition.

Or two strips $3'' \times 9''$ may be cut from the lighter and darker tones of any color. On both of these place $1'' \times 2''$ oblongs of the three remaining tones of the color, *i.e.* light, normal, and dark. Arrange the oblongs with their length extending the long way of the strips and with a space between them. Compare the appearance of the corresponding tones on the two strips. A marked difference will be noted.

The juxtaposition of a neutral and a series of spectrum colors will show great changes in appearance. A number of circles two inches in diameter may be cut from a sheet of neutral paper. A neutral circle may then be pasted in the centre of a red square, five inches side; another in the centre of an orange square, and so on through the six leading colors. The appearance of the neutral circle will be distinctly different in each of the six cases.

Many similar and most interesting experiments can be made, showing the effect of juxtaposition. These should, however, be given to pupils in a sequential order.

Color Values.

Values of different colors.

In considering the proportionate amount of tones or hues to be used, the element of color values has an important place. The different hues have different color values; that is to say, one hue will make a stronger impression on the eye than another hue of equal extent. In order to make restful color arrangements, it is very essential to take into consideration

relative color values, that one color may not overpower another. Values of different colors.

The study of color values can be introduced quite early in the course. Children can readily be led to perceive that one color has more power than another.

Color values are also affected by the colors with which they are combined. This can be shown by experiments in juxtaposition of colors: yellow, for instance, juxtaposed with blue has much more value than when juxtaposed with green or yellow green.

Color values with regard to the distance at which they are seen, present another problem. The full perception of color values requires long-continued study and experience.

Color Qualities.

The terms used in describing color qualities have already been given and defined, pages 9–11. Teachers will readily think of exercises which will develop in pupils' minds the ideas of these different qualities as existing in different colors. The perception of these different qualities may perhaps be best developed by using the extremes of those color qualities; for instance, if the perception of luminosity is to be developed, the most luminous color (yellow) and the least luminous (violet) should be presented together, so as to make it patent that the yellow is light-giving. Transparent colors may be illustrated by colored glass or by water colors. By similar method Quality of color.

Quality of color.

warm and cold colors, advancing and receding colors, may be presented.

These various qualities require careful consideration in the study of harmony of color combinations.

Color Contrasts.

Contrast of colors.

There may be color contrasts of tone as light and dark, and there may be color contrasts of hue. Color contrasts are divided into those of small intervals, of moderate intervals, and of complementaries or great intervals. These intervals are named from the places which the colors occupy on a color circle. If, for instance, the color unit should be made into a circular band of colors instead of the straight band shown by the Color Charts, Nos. 1 and 2, there would be what is called a chromatic circle. Supposing that circle to be made up of colors in equal spaces, it would read as illustrated, page 6, beginning with red at the top, and reading around the circle to the right, red, red orange, orange, yellow orange, yellow, yellow green, green, blue green, blue, blue violet, violet, red violet. If this were still further subdivided into twenty-four colors, as illustrated in the miniature chart, facing page 145, there would be what is known as a small interval between each pair of contiguous colors. Larger intervals, as for instance from red to orange, would be known as a moderate interval, while from a color to its opposite in the circle would be known as a great interval. These colors at great

intervals would be termed complementary. The combination of complementaries harmoniously is a problem of considerable difficulty. If the normal tone of one complementary color is used the better result is generally secured by using a tint or shade of the other. Due regard must also be paid to space values. The study of these different contrasts belongs to a later stage of the work. Contrast of colors.

Color Combinations of Tones.

Through the study of color scales in the methods that have been suggested, the way was prepared for color combinations. The simplest are those from the monochrome scale. Combinations of tones.

A great variety of results may be produced from a scale of five tones; for these may be taken in combinations of two tones, of three tones, of four tones, and of five tones.

In combinations of two tones, the tones selected may be near together in the scale, or they may be removed from each other in the scale. If a soft and flowing result is desired, two tones near together should be taken; if a more decided effect is desired, two tones removed from each other should be taken. In the first case the harmony will be by analogy of tone; in the second case, by contrast of tone.

In combinations of three tones, the effect will generally be better if the lightest of the three be taken as the background; the other tones may be used for

Combinations of tones.

the filling or figure in the arrangement, and for the marginal lines or enclosing figure, as the case may be. If the tones are taken in scale order, the effect is generally not as good, as the result seems then to lack in definiteness.

If four tones are used, in a rosette for instance, it is better as a usual thing, as in the case of three tones, to use the lightest tone as a background; the centre may be either darker or lighter than the units.

In the use of five tones, one of the shades can be used effectively to outline the units. This can be easily done by cutting from the shade a unit slightly larger than the real unit. When the unit of the lighter tone is placed upon the unit of the darker tone, the shade will appear as a dark outline. The choice of tone for this outline should depend on the effect desired, as stated in the paragraph above on combinations of two tones. Subdued contrasts are generally more pleasing than strong contrasts. In no case should there be a partial outline which would appear like a shadow.

Color Combinations of Hues.

Combinations of hues.

The combination of hues is more difficult than that of tones. In the combination of tones there is but one color element to be considered, that of tones, while in the combination of hues a second color element, that of hues, comes in to complicate the problem. Another element which renders the prob-

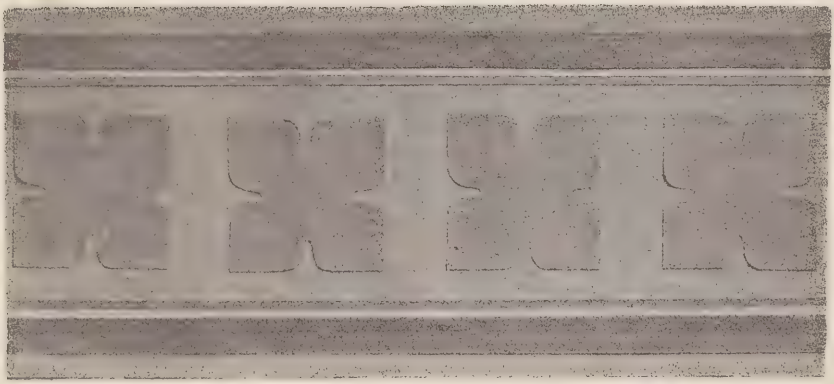


FIG. 65



FIG. 66.

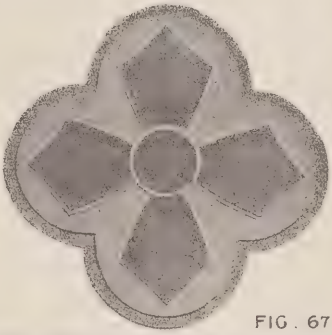


FIG. 67

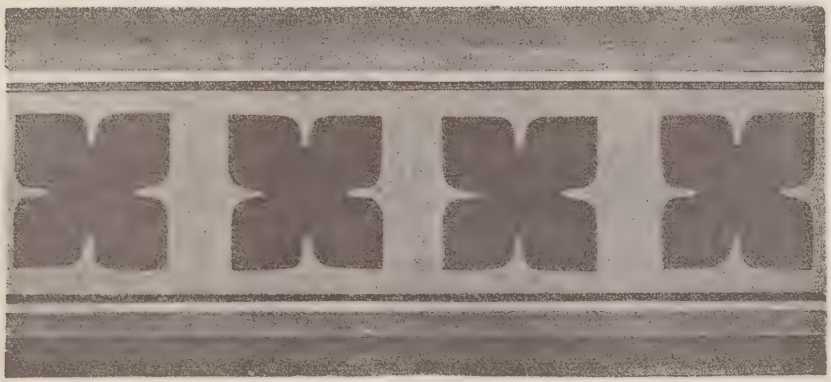


FIG. 68.

lem still more complex is that of shape, proportion, and curvature of the various figures, units, etc., used in decoration. Therefore in a color arrangement tone, hue, and form or shape are to be considered. Combinations of hues.

The combination of hues may be carried on mechanically by following color prescriptions, but it cannot be done intelligently and appreciatively by pupils without much study of color values, of the effect of juxtaposition of colors and of color contrasts, thus basing the work on the cultivation of the color sense.

As a preliminary step toward the study of combining colors, it will be well to pass from the combination of different tones of one color to the combination of a strong color with a sympathetic or analogous color, such as a gray having the same dominant hue. For instance, red violet will be found to be harmonious with red gray, red orange with orange gray, yellow orange with yellow gray, yellow green with yellow gray or green gray, blue green with green gray, and blue violet with blue gray or neutral gray. In considering these colors as harmonious, however, it is not safe to conclude that any or all of the tones of one will combine harmoniously with any or all of the tones of the other. It is a matter of nice study to select such tones as shall produce a harmonious chord — not a discord.

Let the pupils have $1'' \times 2''$ oblongs of each of the five tones of each color in any one of the pairs named above. Let them study these by placing Chords of color.

Chords of color.

them in various relative positions, and from the ten oblongs select five that they think will produce a chord. As a rule it would be possible to find more than one chord that would be pleasing. Having selected the five tones of the two colors, let the pupil arrange them according to the tone value, without regard to hue, proceeding from the lighter to the darker. This will lead to an appreciation of the tone value of different colors. For instance, consider yellow orange and yellow gray to be the colors under consideration. The five tones selected for the chord are yellow orange, L, D, and D D; yellow gray, L and N. In arranging these according to their tone values it will be found that yellow orange L is lighter in tone than yellow gray L, therefore should be placed at the top of the scale, which, when completed, would read: Yellow orange L, yellow gray L, yellow orange D, yellow gray normal, yellow orange D D. This cultivation of the perception of tone values of colors will be a great aid in combining colors. As a general rule, when but two colors are combined, no two of the tones used should have the same tone value.

Again using the five tones selected for the chord, have them select the lightest tone and place above it the oblongs of the same color in their scale order, and below it the oblongs of the other color in their scale order. This will give the general effect of the combination of these tones. It must be noted, however,

these oblongs all being of the same size, that exactly the same amount of each tone is introduced into the combination. It will be a matter of careful study to consider the proportionate amount of each tone that will produce the greatest beauty in combination. Chords of color.

It needs much color cultivation to combine any of the six leading colors in their normal tones. The shades of the leading colors form agreeable combina tions with the tints of the broken and dulled colors. In making surface coverings, pleasing effects may be produced by using a tone of an intermediate color as a background, in combination with the normal and tints of broken and dulled colors.

Combinations of hue may be either of co-ordinate elements, presenting at a little distance a bloom such as that seen on fine Oriental textiles, or they may possess a dominant hue, all others being subordinate.

The element of proportion of colors or tones, which must bring in the consideration of space values, of course, enters into every design that is made; and it will be found that upon its nice adjustment as well as upon the juxtaposing of the various tones and colors the beauty of the design will depend.

Mediation is of great use in harmony of color; if two colors of dissimilar hue, as red and yellow, are to be used, a third color, composed by mixing the two hues, will aid in harmonizing the two. The effect of harmony will be increased if the three colors, viz., the two colors and their mediation, be used in different Mediation.

Mediation.

tones, so that the variation in hue will be balanced in the whole effect by variation of tone.

Black, white, and gray may also be used in mediation. Gold and silver are favorite mediations in historic ornament.

> "And in its warp and woof
> There runs a thread of gold that glitters
> And sometimes in the pattern shows most sweet
> Where there are sombre colors."

Although gold is so fine a mediation, a word of caution must be given about the use of gold and silver in work with colored paper; for it is extremely difficult to obtain at present a gold or silver paper which does not by its tawdriness vulgarize a color combination.

Chords of color in various hues are of great interest; they are seen in historic ornament to vary with different nations. The Egyptians made up their chords without violet; the Hebrews used what Ruskin calls "the great chord of perfect color, — the sacred chord of color, — blue, purple, scarlet, white, and gold," in their desert tabernacle, this chord appearing again in Gothic missal painting; the Greeks worked with red and blue and gold and green; the Romans seemed to have cared more for a dominant; in Byzantine ornament the chord of the Hebrews appears with great splendor, but green was also used, so that a favorite chord was blue and green and purple and white and gold; the principal chords of

the Saracenic style were in red and yellow (or gold) and blue, with subordinate chords of orange and green and violet and gray. The East Indians, in shawls and carpets, use small bits of color to make their restful harmonies. Mediation.

It is well always to connect beauty in one form with beauty in another; the poets give us in rhythmic measure beautiful chords of color. Ruskin, in Volume III. of "Modern Painters," traces the chords of color in Sir Walter Scott. Quoting Scott's celebrated description of Edinburgh, Ruskin says, concerning the colors, "note the rainbow band of them — gloomy or dusky red, sable (pure black), amethyst (pure purple), green, and gold — a noble chord throughout." In another passage he finds an exquisite chord — purple and blue, gold, pale gray passing into black, and the black passing through broken dyes of lichen, into green.

Study of Suitable Color in Construction, Representation, and Decoration.

This belongs mainly to advanced stages of the work, for it means applied color. The field opened by the consideration of the suitable use of color in Construction, in Representation, and in Decoration is a broad one. A word or two may, however, be given bearing on the elementary work. Suitable color.

Geometric views of the type models and of simple objects may be shown in colored paper. Views of In Construction.

In Construction.

the type models can be appropriately shown in colored paper of a tint of brown, thus approximating the color of the models; views of simple objects, whether one or more views, can be most appropriately shown in colors which are seen in the appropriate coloring of the object itself. Thus, a post surmounted by a sphere will be most suitably shown in the color of wood or of stone.

Paper foldings are generally better in tints and in broken or dulled colors, as the result generally gives a mass of too strong color if the foldings are in positive color. Children can be led to discover very early that they cannot find a great deal of bright color in the world about them. Nature is very sparing in her use of unbroken bright colors; they occur only in small quantities at a time, and the whole mass of bright color to be found is very small in proportion to that of broken colors of varying intensity. The bright colors of a sunset are only transitory.

In Representation.

The suitable use of color in Representation must be mainly by the brush, or similar means. Colored paper can be used in very elementary work, but the color should conform to the color of the object.

In connection with the suitable use of color in Representation by the brush, would come a study of the appearance of color when modified in various ways — by strong illumination, by deep shade, by the propinquity of other strong colors, etc. Color, as well as form, has its facts and its appearance.

The suitable use of color in Decoration involves all the study suggested for harmony of color, as well as a further application of harmony of color, by considering it in connection with the structure and surroundings of the object to be decorated. In Decoration.

A very elementary but important application of this is the arrangement of color work on sheets for exhibition, as well as the consideration of the color of the sheets on which the exhibition is to be made. Arrangements made from different colors should not be made upon the same sheet unless there is a strong separating line. The color chosen for the sheets themselves should be a tint of neutral gray. Exhibition work.

In the higher application of color in Decoration the purposes of the thing to be decorated, its general as well as its immediate surroundings, the feelings which are to be awakened or soothed, are some of the problems to be met. The influence of color on the mental and emotional states cannot be doubted; and there is no question but that color may be judiciously or injudiciously used in those respects.

Color Education.

The question of color education is one that touches our whole life, and is worthy of the deepest attention. It has its strong practical side as tending to the industries. It has its educational side as a means of mental development. It has also its spiritual side. Through its study, a growing appreciation of the Its bearing.

Quality of color.

quality of color will arise, — of color which lives and breathes, of glowing, throbbing color of clouds and sky, of color which expresses and of color which controls mental state, of glad color and of sad color, of color which is inspiring and of color which is subduing, of color which is exciting and of color which is soothing, of combinations which are debasing and of harmony which is exalting. "Color is the purifying and sanctifying element of material beauty."

Types of color.

This refinement of the study of color leads more and more to the formation of types — to man's ideal of color. Color in nature masses itself into large general groups, which may be spoken of as typical; but, at the same time, nature gives an infinite variety of hues, changing in almost every example. It is, therefore, impossible to adduce from nature special examples of absolute standards of color, which could be positively predicated as of permanent recurrence. By man's study of nature, types of color are conceived, and from these types the ideal is formed.

"Meanwhile my soul to meditation given
A many-sided mirror, broad and bright,
Reflects whatever meets my thoughtful sight,
The myriad shapes and hues of earth and heaven;
Diffused through all, like odors in the wind
My Mind the Universe, the Universe my Mind!"

— R. H. STODDARD.

A PLAN FOR WORK IN COLOR

IN CONNECTION WITH THE

DRAWING-BOOKS OF THE PRANG SHORTER COURSE
IN FORM STUDY AND DRAWING.

SHORTER COURSE DRAWING-BOOKS.

GENERAL PLAN OF WORK.

The outline for the Shorter Course Drawing-Books is the same as the outline for the Complete Course books.

The assortments of colored paper for the Shorter Course are the same as for the Complete Course, with the exception of Book V., which has assortment E E instead of E.

The general methods are the same; therefore, in the schedule of work which follows, reference is made to the corresponding chapters, treating the work of the Complete Course.

The spirit of the work must be constantly kept in mind; it must never be dogmatic nor mechanical. It should always be presented so as to be a delight to the child. Color is in itself so attractive that its use in the schoolroom may be made a means of reaching the children to an unusual degree.

For the first and second year's work refer to Chaps. I., II., III., and IV., pages 27–82.

THIRD YEAR.

Shorter Course, Book I.

Colors to be Studied.

Three intermediate colors: Red Violet, Red Orange, Yellow Orange, and two tints of each.

Colored Papers.

Assortment C.

[For methods of work in this book see Chapter V., pages 83–90.]

Section I. — **Review — Color Perception.**

A. — Renew investigations as to Perception of Color. For this purpose study Chapter I., pages 27–43 very carefully.

Use color tablets borrowed from the primary grades.

Section II. — **Ideal Color Unit.**

A. — Have the pupils paste the ideal color unit, made from the $\frac{1}{2} \times 1\frac{1}{2}$ inch papers, on the second blank page in the middle of the book.

Section III. — **Study of Individual Color — Relation of Tones — Scaling — Making.**

Three intermediates.

A. — Lead the pupils to study the individual color, red violet and its tints, and have them arrange the scale from the 1×2 inch papers.

B. — Lead the pupils to study the individual color, red orange and its tints, and have them arrange the scale from the 1 × 2 inch papers. Red orange.

C. — Lead the pupils to study the individual color, yellow orange and its tints, and have them arrange the scale from the 1 × 2 inch papers. Yellow orange.

D. — Have the pupils paste the scales from the 1 × 2 inch papers of red violet, red orange, and yellow orange on the third page of the cover of the book, or on a sheet of manila paper, arranging the tints at the upper and the normal at the lower part of the scale. The three scales should occupy equal parts of the page, making the arrangement orderly. Scales.

E. — Have the pupils cut and paste a circle of red violet for page 3 of the Drawing-Book. Circle. Red violet.

F. — Let the pupils cut and fold a square of normal red orange paper as suggested in the Manual text for page J of the Drawing-Book, and paste in the middle of the printed square. Square. Red orange.

G. — Have the pupils make a border of normal yellow orange for page 7 of the Drawing-Book. Border. Yellow orange.

H. — Have the pupils make the quatrefoil within a square for page 8 of the Drawing-Book of two tints of red violet, and paste it on the illustration, Fig. 1. The quatrefoil should be smaller than the square. Quatrefoil. Red Violet.

I. — Have the pupils make the Greek cross for page 9 of the Drawing-Book of light red orange, and paste it in the space indicated for it. Greek cross. Red orange.

Border.

J. — Let the pupils choose a border for page R of the Drawing-Book, and the color for making it. The choice of borders may be from Plate 10. One or two tones of red violet, red orange, or yellow orange may be used.

Choice.

K. — Give the pupils opportunity to make arrangements of the color remaining.

FOURTH YEAR.

Shorter Course, Book II.

Colors to be Studied.

Three intermediate colors: Yellow Green, Blue Green, Blue Violet, with two tints of each.

Colored Papers.

Assortment CC.

[For methods of work in this book see Chapter VI., pages 91–95.]

Section I. — **Review — Color Perception.**

Color perception.

A. — Base the color work on the power of color perception in the pupils. Study Chapter I., pages 27–43, very carefully and follow the methods there suggested for investigating color perception.

Use color tablets borrowed from the primary grades.

SECTION II. — **Study of Individual Color — Relation of Tones — Scaling — Making.**

Three intermediates.

A. — Lead the pupils to study the individual color yellow green and its tints. Have the pupils arrange the scale from the 1 × 2 inch papers.

B. — Lead the pupils to study blue green and its tints, and have them arrange the scale from the 1 × 2 inch papers.

C. — Lead the pupils to study blue violet and its tints, and have them arrange the scale from the 1 × 2 inch papers.

Scale according to hue.

D. — Have the pupils arrange the $\frac{1}{2} \times 1\frac{1}{2}$ inch papers according to hue in the order of the ideal color unit, and paste this scale of the lighter tint on the second blank page in the middle of the book.

Scales according to tone.

E. — Have the children paste the scales of the 1 × 2 inch papers of yellow green, blue green, and blue violet on a sheet of manila paper, arranging the tints at the upper and the normal at the lower part of the scale.

The three scales should occupy equal parts of the page, making the arrangement orderly.

Oblong. Yellow green.

F. — Have the pupils cut and paste an oblong of yellow green for page E of the Drawing-Book, making it the size of the oblong given.

Quatrefoil. Blue green.

G. — Have the pupils make the design in the quatrefoil for page 9 of the Drawing-Book, of the tints of blue green, and of the same size as the illus-

Quatrefoil. Blue green.

tration, Fig. 5. Let them paste it on Fig. 5, and make a drawing of it in Fig. 6.

Border. Blue green.

H. — Have the pupils make a border of the tints of blue green, using the dog-tooth ornaments on page 7 as a repeat. Let them mount it on one of the middle blank pages of the Drawing-Book.

Choice.

I. — Allow the pupils to make a border or figure from the colored paper remaining. It is very desirable that there should be opportunity for free choice in color work.

FIFTH YEAR.

Shorter Course, Book III.

Colors to be Studied.

The six leading colors, Red, Orange, Yellow, Green, Blue, Violet, and two tints and two shades of each.

Colored Papers.

Assortment D.

[For method of work in this book see Chapters VII. and VIII., pages 96–109.]

Section I. — Review — Color Perception.

Color perception.

A. — Study carefully Chapter I., and carry out the exercises given for investigation as to Choice of Color, Perception of the Relationship of Color, Knowledge of Color Names, and Perception of Individual Color. Use color tablets borrowed from the primary grades.

B. — Investigate as to the perception of the relationship of tone, regarding shades as well as tints. Color relation.

SECTION II. — **Study of Individual Color — Relations of Tones — Scaling — Making.**

A. — Review the study of red and its tints. Lead pupils to study shades of red and have them arrange the scale of five tones from the 1 × 2 inch papers. Red.

B. — Review the study of orange and its tints. Lead pupils to study shades of orange and have them arrange the scale of five tones from the 1 × 2 inch papers. Orange.

C. — Review the study of yellow and its tints. Lead pupils to study shades of yellow and have them arrange the scale of five tones from the 1 × 2 inch papers. Yellow.

D. — Review the study of green and its tints. Lead pupils to study shades of green and have them arrange the scale of five tones from the 1 × 2 inch papers. Green.

E. — Review the study of blue and its tints. Lead pupils to study shades of blue and have them arrange the scale of five tones from the 1 × 2 inch papers. Blue.

F. — Review the study of violet and its tints. Lead pupils to study shades of violet and have them arrange the scale of five tones from the 1 × 2 inch papers. Violet.

G. — Have the pupils scale to hue, from the 1 × 2 inch papers, first using the N's (normals), making a scale in which the intermediates are missing, then Scales according to hue.

Scales according to hue.

arranging the L's (light tones), and then the L L's (lighter tones), giving scales in tints. Have scales made from the shades in the same way.

Scales according to tone.

H. — Have the pupils paste the scales from the 1 × 2 inch papers of the five tones of red, orange, and yellow on the second blank page in the middle of the book, and the scales of green, blue, and violet on the third blank page in the middle of the book, arranging the tints at the upper and the shades at the lower part of the scale.

Rosette. Dark red.

I. — Have the pupils make rosette of D (dark) red for page 7 of the Drawing-Book. Inasmuch as the rosette is five inches in diameter, and the paper is only four inches wide, it may be necessary to piece it, which is not objectionable.

Oblong quatrefoil. Orange.

J. — Have the pupils make the oblong quatrefoil for page 9 of the Drawing-Book, using L L (lighter), L (light), and D (dark) tones of orange.

Border. Yellow.

K. — Have the pupils make the border given in Fig. 2, page 8 of the Drawing-Book, using D (dark) and D D (darker) tones of yellow, and mount it on page T.

Choice.

L. — Let the pupils cut and make figures and arrangements, according to their own choice, from the paper remaining. Lead them to express their own ideas of beauty in the use of color. Such effort will develop their sense of beauty in color and figure, and their power to produce the beautiful.

SIXTH YEAR.

Shorter Course, Book IV.

Colors to be Studied.

The six intermediate colors: Red Violet, Red Orange, Yellow Orange, Yellow Green, Blue Green, Blue Violet, with two tints and two shades of each.

Colored Papers.

Assortment EE.

[For method of work in this book see Chapters IX. and X., pages 110–121.]

Section I. — Review — Color Perception.

Color perception.

A. — Study carefully Chapter I. and carry out the exercises given for investigation as to Choice of Color, Perception of the Relationship of Color, Knowledge of Color Names, and Perception of Individual Color.

Color relation.

Use color tablets borrowed from the primary grades.

B. — Investigate as to the perception of the relationship of tone, regarding shades as well as tints, following the method of A, **Recognition of Tone,** page 69.

Section II. — Review of Individual Color — Relation of Tones — Scaling — Making.

Red violet.

A. — Review the study of red violet and its tints. Lead the pupils to study the shades of red violet and to arrange the scale from the $\frac{1}{2} \times 1\frac{1}{2}$ inch papers.

Red orange.

B. — Review the study of red orange and its tints. Lead the pupils to study the shades of red orange and to arrange the scale from the $\frac{1}{2} \times 1\frac{1}{2}$ inch papers.

Yellow orange.

C. — Review the study of the five tones of yellow orange and its tints. Lead the pupils to study the shades of yellow orange and to arrange the scale from the $\frac{1}{2} \times 1\frac{1}{2}$ inch papers.

Yellow green.

D. — Review the study of the five tones of yellow green and its tints. Lead the pupils to study the shades of yellow green and to arrange the scale from the $\frac{1}{2} \times 1\frac{1}{2}$ inch papers.

Blue green.

E. — Review the study of the five tones of blue green and its tints. Lead the pupils to study the shades of blue green and to arrange the scale from the $\frac{1}{2} \times 1\frac{1}{2}$ inch papers.

Blue violet.

F. — Review the study of the five tones of blue violet and its tints. Lead the pupils to study the shades of blue violet and to arrange the scale from the $\frac{1}{2} \times 1\frac{1}{2}$ inch papers.

Scale according to hue.

G. — Have the pupils arrange scales from the $\frac{1}{2} \times 1\frac{1}{2}$ inch papers according to hue (see B, **Scaling to Hue and Tone,** page 78), as suggested in G, **Scaling according to Hue,** page 114, using only the intermediate colors. When the scales are complete, have the children find from the assortment of paper the D (dark) tones of the six leading colors, and insert them in their relative position in the D scale. This scale may be pasted on the second blank page

in the middle of the book, or on a sheet of drawing paper. Scale according to hue.

H. — Have the pupils paste scales of three tones, L (light), L L (lighter), and N (normal), of red violet, red orange, and yellow orange on the third blank page in the middle of the book. Scale according to tone.

I. — Have the pupils make the border for page 7 of D (dark) yellow green, cutting the spiral line more than $\frac{1}{8}$ of an inch wide, and mount it in the space below the illustration. In this case the color work takes the place of drawing. The appreciation of beautiful form and curvature is sometimes attained better through color than by drawing the outline only. Border. Yellow green.

J. — Have the pupils make the rosette for page 9, using N (normal), L (light), and L L (lighter) tones of blue green. Rosette. Blue green.

K. — Have the pupils make rosette of N (normal), L (light), and D (dark) tones of blue violet. Rosette. Blue violet.

L. — Give the pupils opportunity to make rosettes, borders, or figures from the papers remaining. Lead them to see that very striking contrasts of tone are not as desirable as more moderate contrasts, and that this is as true in dress and other ornament as in colored paper. Choice.

SEVENTH YEAR.

Shorter Course, Book V.

Colors to be Studied.

Four grays: Gray, Red Gray, Orange Gray, Yellow Gray with two tints and two shades of each.

Colored Papers.

Assortment F.

[For method of work in this book see Chapter XI., pages 122–129.]

Section I. — Review — Color Perception.

A. — It will aid the teacher much in the succeeding work to study carefully Chapter I. and make the investigations there suggested as to the state of color perception in the pupils. These investigations will serve as a basis for subsequent work.

Use color tablets borrowed from the primary grades.

Section II. — Study of Individual Color — Relation of Tones — Scaling — Making.

Review.

A. — Lead the pupils to study red gray or russet, also its tints and shades, as suggested in the study of the various individual colors in Chapter I., pages 40–56. Have the pupils arrange the scale in five tones from the 1 × 3 inch papers.

B. — Lead the pupils to the study of red gray or brown, also its tints and shades. Have the pupils arrange the scale in five tones from the 1 × 3 inch papers. Review.

C. — Lead the pupils to study yellow gray or citrine, also its tints and shades. Have the pupils arrange the scale in five tones from the 1 × 3 inch papers.

D. — Have the pupils paste the scales, from the 1 × 3 inch papers of red gray, orange gray, and yellow gray on the second blank page in the middle of the book, arranging the tints at the upper and the shades at the lower part of the scale. Scales according to tone.

E. — Have the pupils make the *fleur-de-lis* for page 7, of N (normal) red gray, and paste it on the illustration, or in the vacant space beside it. Fleur-de-lis.

F. — Have the pupils make a unit for page 8, of L (light), yellow gray. Unit.

G. — Have the pupils make a border for page 9, of N (normal), L (light), and L L (lighter) tones of orange gray. In arranging the tones, avoid the appearance of scaling, as it gives a perspective effect not allowable in decoration. Consider carefully space values (see page 61).

H. — Encourage any additional work possible with the supply of paper. Talk freely with pupils as to choice of color for ceiling, walls, and floor of a room. Lead them to see that as all decoration should be modest, the colors chosen for a room should not be glaring.

LIST OF COLORED PAPERS CONTAINED IN THE ASSORTMENTS.

ASSORTMENT AA.

FOR FIRST YEAR OF SCHOOL — SECOND HALF.

12 pieces, 1½ × 8, for cutting, as follows: —

2 pieces of each of the six leading colors: Red, Orange, Yellow, Green, Blue, Violet.

ASSORTMENT B.

FOR SECOND YEAR — FIRST HALF.

18 pieces, 1 × 2, for scaling to tone, as follows: —

1 piece of each of the six leading colors: Red, Orange, Yellow, Green, Blue, Violet, and their two tints.

6 pieces, 4 × 8, for cutting, as follows: —

1 Light Red,	1 Lighter Red,
1 Light Orange,	1 Lighter Orange,
1 Light Yellow,	1 Lighter Yellow.

ASSORTMENT BB.

FOR SECOND YEAR — SECOND HALF.

18 pieces, 1 × 2, for scaling to hue and to tone, as follows: –

1 piece of each of the six leading colors: Red, Orange, Yellow, Green, Blue, Violet, and their two tints.

6 pieces, 4 × 8, for cutting, as follows: —

1 Light Green,	1 Lighter Green,
1 Light Blue,	1 Lighter Blue,
1 Light Violet,	1 Lighter Violet.

ASSORTMENT C.

For Book I.

THIRD YEAR — FIRST HALF.

12 pieces, ½ × 1½, for scaling to hue, as follows: —

1 piece of each of the six leading colors: Red, Orange, Yellow, Green, Blue, Violet; and 1 piece of each of the six intermediates: Red Orange, Yellow Orange, Yellow Green, Blue Green, Blue Violet, Red Violet.

9 pieces, 1 × 2, for scaling to tone, as follows: —

1 Red Violet,	1 Light Red Violet,	1 Lighter Red Violet,
1 Red Orange,	1 Light Red Orange,	1 Lighter Red Orange,
1 Yellow Orange,	1 Light Yellow Orange,	1 Lighter Yellow Orange.

6 pieces, 4 × 8, for cutting, as follows: —

1 Red Violet,	1 Light Red Violet,
1 Red Orange,	1 Light Red Orange,
1 Yellow Orange,	1 Light Yellow Orange.

ASSORTMENT CC.

For Book II.

THIRD YEAR — SECOND HALF.

12 pieces, ½ × 1½, for scaling to hue, as follows: —

1 piece each of the lighter tint of the six leading and of the six intermediate colors.

9 pieces, 1 × 2, for scaling to tone, as follows: —

1 Yellow Green,	1 Light Yellow Green,	1 Lighter Yellow Green,
1 Blue Green,	1 Light Blue Green,	1 Lighter Blue Green,
1 Blue Violet,	1 Light Blue Violet,	1 Lighter Blue Violet.

6 pieces, 4 × 8, for cutting, as follows: —

1 Yellow Green,		
1 Blue Green,	1 Light Blue Green,	
1 Blue Violet,	1 Light Blue Violet,	1 Lighter Blue Violet.

ASSORTMENT D.

For Book III.

FOURTH YEAR — FIRST HALF.

30 pieces, 1 × 2, for scaling to tone, as follows: —

1 piece each of the five tones — *lighter*, *light*, *normal*, *dark* and *darker* of the six leading colors.

6 pieces, 4 × 8, for cutting, as follows: —

1 Dark Red,
1 Dark Orange, 1 Light Orange, 1 Lighter Orange.
1 Dark Yellow, 1 Darker Yellow,

ASSORTMENT DD.

For Book IV.

FOURTH YEAR — SECOND HALF.

36 pieces, ½ × 1½, for scaling to hue and tone, as follows: —

1 piece of each of the five tones of the six leading colors, and 1 piece of each of the *light* tint of the six intermediate colors.

7 pieces, 4 × 8, for cutting, as follows: —

1 Green, 1 Light Green, 1 Dark Green,
1 Dark Blue,
1 Violet, 1 Light Violet, 1 Dark Violet.

ASSORTMENT E.

For Book V.

FIFTH YEAR — FIRST HALF.

30 pieces, 1 × 2, for scaling to tone, as follows: —

1 piece of each of the five tones of the six intermediate colors.

7 pieces, 4 × 8, for cutting, as follows: —

1 Dark Red Violet,
1 Red Orange, 1 Light Red Orange, 1 Dark Red Orange,
1 Yellow Orange, 1 Light Yellow Orange, 1 Dark Yellow Orange.

THE PRANG COLORS.

TEACHERS who are instructing children in color will be interested to know something of the origin, purpose, and plan of the materials for color teaching devised by Mr. Louis Prang.

Mr. Prang's work for over fifty years has included large enterprises in the line of color printing and the reproduction of paintings in oil and water color. Many years ago he saw the great need of definite standards of color, and a simple, intelligible nomenclature of color for the assistance of those who use color materials in the arts and industries. In the course of his work, and his own continuous study of the subject, he came to feel strongly the value of color study as a part of general education, and enlarged his experiments with the definite purpose of producing in a practical, material form, a series of standard colors as a basis for color instruction in the schools.

The choice of a scale of standard colors, covering the complete unit of pure color, had Mr. Prang's most serious consideration. The only flowing band of color in nature is to be found in the solar spectrum, but this is incomplete. The solar spectrum leaves out typical red, its reddest hue being distinctly yellowish, and it also leaves out a series of reddish hues intermediate between reddish violet and spectrum red. Besides being thus incomplete in its series, it has not the stability necessary for a proper guide. The variations of the colors composing it, in tone, in intensity, in absolute and relative luminosity, influenced by the time of day and atmospheric conditions, are such that no reliance is to be placed on it for the construction of a harmonious scale of normal hues. Nature here, as in all its phenomena, can serve man only as a study for the recognition of the underlying laws; it is his mission to evolve ideals based on these laws; and the ideal unit of pure color is the result of Mr. Prang's study of the spectrum in connection with the whole question

of color phenomena. A harmonious scale of colors, covering in twenty-four equal intervals this unit, cannot by any possibility be a slavish copy of certain arbitrarily chosen colors of the spectrum; they must be the result of careful judging and weighing under the guidance of well-digested principles and educated color judgment.

It was not deemed sufficient to consider simply the standard of each hue by itself; it was found necessary to consider also its relation to all the other hues of the scale in all possible ways, and, besides, to consider the harmony of the whole. This relation of each color to each other color, and their harmonious arrangement as a whole, constitute the distinguishing features of the whole scheme.

The first work considered necessary for Mr. Prang to accomplish was to paint models, not only for his series of normal colors, but also for all tones of each scale, to allow him to judge of the whole scheme when finished, as harmony had to be obtained in all directions. These models were intended to serve as a permanent color standard by which, in future, all his colored papers could be manufactured, and thus enable him to command a continuity of the hues once adopted, as nearly perfect in every edition as experienced workmen can produce. The painting of these models was a work of years, and required almost superhuman patience. The counsel and judgment of artists and colorists came to Mr. Prang's aid, and his decision in the choice of one or the other hue was often determined only after weeks of consideration.

The "Maxwell disk" was tried, as a means of determining desirable tints and shades, but Mr. Prang soon found (as well as Professor Rood, and other authorities on color) that the tones produced by its means are in most cases thrown out of harmony with the original color, and are thus worthless as examples of correct color scaling. Nothing else would do but cultivated feeling and judgment for color harmony, in order to produce scales worthy of acceptance as standards for educational, artistic, and industrial service.

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THE TWENTY-FOUR COLORS OF THE COLOR UNIT,

THEIR TINTS AND SHADES.

R LL	RRO LL	RO LL	ORO LL	O LL	OYO LL	YO LL	YYO LL	Y LL	YYG LL	YG LL	GYG LL	G LL	GBG LL	BG LL	BBG LL	B LL	BBV LL	BV LL	VBV LL	V LL	VRV LL	RV LL	RRV LL
R L	RRO L	RO L	ORO L	O L	OYO L	YO L	YYO L	Y L	YYG L	YG L	GYG L	G L	GBG L	BG L	BBG L	B L	BBV L	BV L	VBV L	V L	VRV L	RV L	RRV L
R	RRO	RO	ORO	O	OYO	YO	YYO	Y	YYG	YG	GYG	G	GBG	BG	BBG	B	BBV	BV	VBV	V	VRV	RV	RRV
R D	RRO D	RO D	ORO D	O D	OYO D	YO D	YYO D	Y D	YYG D	YG D	GYG D	G D	GBG D	BG D	BBG D	B D	BBV D	BV D	VBV D	V D	VRV D	RV D	RRV D
R DD	RRO DD	RO DD	ORO DD	O DD	OYO DD	YO DD	YYO DD	Y DD	YYG DD	YG DD	GYG DD	G DD	GBG DD	BG DD	BBG DD	B DD	BBV DD	BV DD	VBV DD	V DD	VRV DD	RV DD	RRV DD

THE SEVEN GRAYS,

THEIR TINTS AND SHADES.

Gy LL	RGy LL	OGy LL	YGy LL	GGy LL	BGy LL	VGy LL
Gy L	RGy L	OGy L	YGy L	GGy L	BGy L	VGy L
Gy	RGy	OGy	YGy	GGy	BGy	VGy
Gy D	RGy D	OGy D	YGy D	GGy D	BGy D	VGy D
Gy DD	RGy DD	OGy DD	YGy DD	GGy DD	BGy DD	VGy DD

THESE diagrams show the scheme or plan devised by Mr. Louis Prang as a basis for the production of typical or "ideal" color scales. The intervals of the normal colors (Red to Red Violet), as well as the intervals of the tones in each of the scales (*e.g.*, Lighter Red to Darker Red or Lighter Blue to Darker Blue), were chosen and equalized with reference to harmonious relations, not only of the normal colors themselves, but also of all the scales composing the scheme, whether scales of hues, of tones, or of both hues and tones at once. As shown in the diagrams, scales of *hue* may be traced along horizontal lines, *e.g.*, Red to Red Red Violet. Scales of *tone* may be traced along vertical lines, *e.g.*, Lighter Red to Darker Red. Scales of *both hue and tone* may be traced along oblique lines, *e.g.*, Darker Red to Lighter Orange. Similarly harmonious scaling is obtained in the broken colors.

A diagram on Plate 13 shows the plan and scope of the scheme of scales based on the twenty-four normal standard hues, covering the unit of pure color. This division into twenty-four intervals provides for a precise nomenclature, and at the same time makes possible still further classification and nomenclature of the more subtle intermediate colors, all with equal precision.

Besides these scales of unbroken colors, Mr. Prang produced a scale of neutral and "broken" colors. He first produced a typical neutral gray, *i.e.* a gray inclining neither toward red, yellow, nor blue. He then, by the addition of black, "broke" the six leading colors of the color unit, Red, Orange, Yellow, Green, Blue, and Violet, and thus produced representative examples of the colors known by artists as tertiaries (Russet, Citrine, Olive), as well as Brown, Slate, and Heliotrope. Each of these seven normal broken colors was then made the centre of a tone-scale of its own, extending from light to dark, as shown in a diagram on Plate 13.

Certain considerations were necessitated by the use which these papers were to serve in the hands of children and the general public, and the choice among available pigments became restricted by three conditions of special importance.

These conditions were : —

I. Freedom from arsenic, which enters into the manufacture of some otherwise more desirable pigments.

II. Permanency, as far as the choice between available pigments permitted.

III. Adaptability for opaque coloring of paper.

The first condition has been met absolutely. The second condition has been met, as far as permitted, by a choice among pigments restricted by the other paramount conditions.

In the simple and clear nomenclature which Mr. Prang has adopted

for his standard colors, he followed other authors on the subject. The color names of the "spectrum" scale will be easily understood if the reader recalls the familiar names of the points of the compass, only assuming three instead of four cardinal points, viz., Red, Yellow, and Blue. (See Plate 14.) The names of the neutral and broken colors need no explanation.

GRAY,
RED GRAY *or* RUSSET,
ORANGE GRAY *or* BROWN,
YELLOW GRAY *or* CITRINE,
GREEN GRAY *or* OLIVE,
BLUE GRAY *or* SLATE,
VIOLET GRAY *or* HELIOTROPE.

The Prang Standard Colored Papers are cut in various shapes and sizes, and put up in packages ready for school use. They are also made up into Color Charts and Color Tablets.

PRICES.

Colored Papers:

Package, 50 sheets, 6 × 9, one color only in a package	$0.30
" 100 " 5 × 5, " " " " " "	.30
" 100 " 4 × 4, " " " " " "	.20
" 100 strips, ¼ × 9, " " " " " "	.05
" 100 " ⅛ × 9, " " " " " "	.05
Loose, 24 × 28, per quire	1.50
" 24 × 28, single sheet	.10

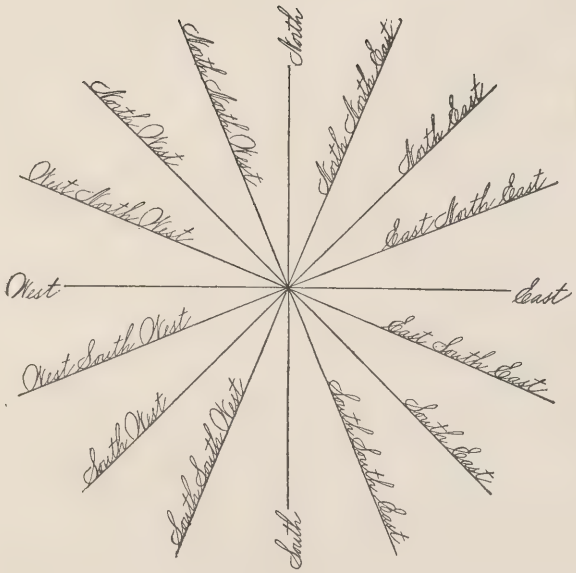
Color Tablets:

"Assortment B" (for Primary Grades, 72 pieces) per box	.10

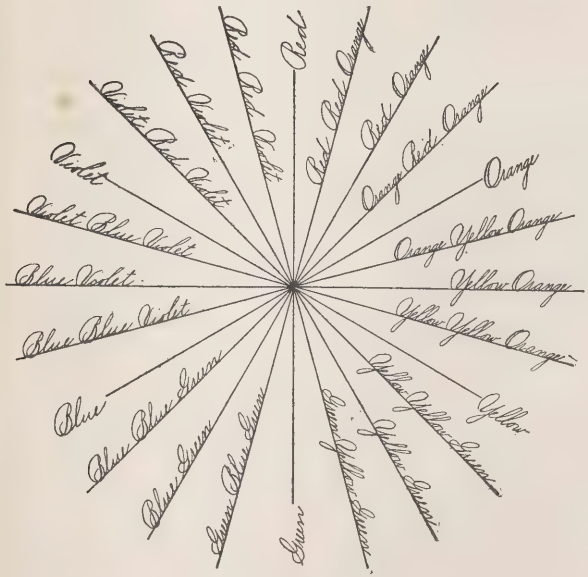
Color Charts:

The Prang Color Chart, No. 1, each	.75
The Prang Color Chart, No. 2, "	.75
Prang's Prismatic Spectrum "	1.00

NOMENCLATURE OF THE PRANG STANDARD COLORS.



POINTS OF COMPASS.



POINTS OF COLOR.

DIAGRAM, showing the plan of nomenclature of Prang's Standard Colors. In reading the right-hand figure, three "Cardinal Points" should be assumed, — Red, Yellow, and Blue.

Prices for Special Assortments described in this Manual.

Assortment	AA	for	1st	year,	2d	half,	per	dozen	.	.	.	.	$0.50
"	B	"	2d	"	1st	"	"	"	.	.	.	.	.75
"	BB	"	2d	"	2d	"	"	"	.	.	.	.	.75
"	C	"	Complete Course, Book 1, per dozen						.	.	.	.	.75
"	CC	"	"		"		"	2, " "	.	.	.	.	.75
"	D	"	"		"		"	3, " "	.	.	.	.	.75
"	DD	"	"		"		"	4, " "	.	.	.	.	.75
"	E	"	"		"		"	5, " "	.	.	.	.	.75
"	EE	"	"		"		"	6, " "	.	.	.	.	.75
"	F	"	"		"		"	7, " "	.	.	.	.	.75
"	FF	"	"		"		"	8, " "	.	.	.	.	.75
"	G	"	"		"		"	9, " "	.	.	.	.	.75
"	GG	"	"		"		"	10, " "	.	.	.	.	.75

Discounts to schools and to the trade quoted on Application. Assortments made up to order at special prices.

It is especially desirable that the color instruction of Kindergartens and that of Primary and Grammar Schools shall be so conducted as to make one consistent whole. In order to make this practicable Prang's Standard Colored Papers have been cut in various shapes, sizes, and assortments, ready for use in the regular Kindergarten occupations. These Kindergarten papers may be obtained through the Kindergarten Supply houses of E. Steiger & Co., 25 Park Place, New York City, and W. A. Olmsted, 182 Wabash Ave., Chicago.

For further information about materials for color teaching address

THE PRANG EDUCATIONAL COMPANY,

646 Washington St., BOSTON. 43-47 East 10th St., NEW YORK. 151 Wabash Ave., CHICAGO.

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